UNC	LASSIF	J(	BLIOGR	APHY OF R J ZEM RL-TR-7	RESEA	RCH REF	AB WRI	ND PUBI	LICATIO	NS: IM	PACT. V	F/G 6/ /IRRE	TC (U)
	OF   A042201	- S		Desirent.				Property of the control of the contr		State of the American	The state of the s		
Equipment of the control of the cont							Section 1 and 1 an	Section 2 of the section of the sect	The second secon	Without a three many trans- tion and paging a source of many from the same. Personal and a source and a sourc	Provided 227 Branch State 127 Branch Sta	Bilder of the company Description of the company of	
												Language Market	March Control of the
				Proceedings of the control of the co		Control of the contro	And the second s	No.		END DATE FILMED 8-77			

Ú

AMRL-TR-76-120

1942-1976

BIBLIOGRAPHY OF RESEARCH REPORTS AND PUBLICATIONS



Richard J. Zember, Chief Master Sergeant Joan Canby Robinette

Impact, Vibration, Windblast and Escape

July 1977

Approved for public release; distribution unlimited

AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO



## NOTICES

When US Government drawings, specifications, or other data are used for any purpose other than a definitely related Government procurement operation, the Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Please do not request copies of this report from Aerospace Medical Research Laboratory. Additional copies may be purchased from:

National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

Federal Government agencies and their contractors registered with Defense Documentation Center should direct requests for copies of this report to:

Defense Documentation Center Cameron Station Alexandria, Virginia 22314

# **TECHNICAL REVIEW AND APPROVAL**

AMRL-TR-76-120

The experiments reported herein were conducted according to the "Guide for the Care and Use of Laboratory Animals," Institute of Laboratory Animal Resources, National Research Council.

The voluntary informed consent of the subjects used in this research was obtained as required by Air Force Regulation 80-33.

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.

FOR THE COMMANDER

HENNING E. VON GIERKE

Director

Biodynamics and Bionics Division

Aerospace Medical Research Laboratory

de 6. mais

NTIS	White Section Z
DDC	Buff Section
UNANNOU	NCED
JUSTIFICA	TION
	TION/AVAILABILITY CODES
	VAIL and / CE SPECIAL
Dist. A	

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM		
1. REPORT NUMBER  AMRL-TR-76-120  2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER		
4. TITLE (and Subute) BIBLIOGRAPHY OF RESEARCH REPORTS AND PUBLICATIONS: Impact, Vibration, Windblast and Escape1942-1976	5. TYPE OF REPORT & PERIOD COVERED Bibliography 1942-1976		
1	6. PERFORMING ORG. REPORT NUMBER		
Compiled by: Richard J./Zember Chief Master Sergeant Joan Canby Robinette	8. CONTRACT OR GRANT NUMBER(5)		
9. PERFORMING ORGANIZATION NAME AND ADDRESS Aerospace Medical Research Laboratory, Aerospace Medical Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio 45433	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS		
11. CONTROLLING OFFICE NAME AND ADDRESS	Jul 377		
(2) 17 P. J (1)	13. NUMBER OF PAGES		
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Off )	15. SECURITY CLASS. (of this report) UNCLASSIFIED		
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE		
16. DISTRIBUTION STATEMENT (of this Report)			
Approved for public release; distributi	on unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different fro	m Report)		
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Impact			
Vibration Windblast Escape			
Bibliography 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)			
This bibliography lists technical reports in the arwindblast, and escape published from 1942 to 1976 because the Research Laboratory. Five appendices include titles impact, windblast and escape published from 1942 to Laboratory, Holloman AFB, New Mexico, and USAF Scholbrooks AFB, Texas.	by the Aerospace Medical s of reports in the areas of 1958 by Aeromedical Research		

DD 1 JAN 73 1473

EDITION OF 1 NOV 65 IS OBSOLETE

009 850

PERPORT DOCUMENTATION PAGE
Approved for public reloces of stribution of the section of the se

# TABLE OF CONTENTS

SECTION	<u>P</u>	AGE									
I	IMPACT	. 1									
II	VIBRATION	12									
III	WINDBLAST	25									
IV	ESCAPE	27									
APPENDICES											
OTHER AEROSPACE MEDICAL DIVISION LABORATORIES											
	1942 - 1958										
Α.	Impact - Aeromedical Research Laboratory Holloman AFB, New Mexico	38									
В.	<pre>Impact - USAF School of Aerospace Medicine Brooks AFB, Texas</pre>	41									
с.	Windblast - Aeromedical Research Laboratory Holloman AFB, New Mexico	43									
D.	Escape - Aeromedical Research Laboratory Holloman AFB, New Mexico	44									
Ε.	Escape - USAF School of Aerospace Medicine Brooks AFB, Texas	45									

# SECTION I IMPACT

Martin, E. E., TEST OF INERTIA LOCK FOR USE ON CRASH HARNESSES, TSELA5B-696-67, 18 October 1944.

ATTENDANCE AT THE FOURTH CRASH INJURY CONFERENCE, WASHINGTON, D. C. 21-22 FEB 1945, TSEAL3-695, p. 32, 9 March 1945.

CENTRIFUGE TEST OF INERTIA LOCK FOR USE ON CRASH HARNESSES, TSEAL-3-696-77, 8 June 1945.

Coles, C. H., ABRUPT DECELERATION OF ANIMALS, TSEAL-6F-181, 4 July 1945.

Moore, W. L. and Hertzberg, H. T. E., MODIFIED FOOTBALL HELMET AS FLYER'S PROTECTIVE HELMET, TSEAA-666-14, 26 August 1947.

Gamble, J. L., Jr., and Shaw, R. S., ANIMAL STUDIES ON IMPACT NEGATIVE ACCELERATION, MCREXD-695-74 G, March 1948.

Moore, W. L., DEVELOPMENT OF HELMET-FLYING, PILOT'S PROTECTIVE, TYPE P-1, MCREXD-666-14A, 20 August 1948.

Ames, W. H., "Human Tolerance to High Linear Accelerations of Short Duration," Military Surgeon 103(2):96-99, August 1948.

Stapp, J. P., "Problems of Human Engineering in Regard to Sudden Decelerative Forces on Man," Military Surgeon 103(2):99-102, August 1948.

Moore, W. L., MODIFICATION OF TYPE P-1 PROTECTIVE HELMET AND STANDARD FLYING HELMETS FOR USE BY FIGHTER AND JET AIRCRAFT PILOTS, MCREXD-666-14B, 29 December 1948.

Staff - Aero Medical Laboratory, SYNOPSIS OF THE AERO MEDICAL ASPECTS OF JET PROPELLED AIRCRAFT, January 1949.

Denzin, E. C., A DECELERATOR FOR HUMAN EXPERIMENTATION, AFTR 5973, April 1949.

Stapp, J. P., HUMAN EXPOSURES TO LINEAR DECELERATION. PART I. PRE-LIMINARY SURVEY OF AFT-FACING SEATED POSITION, AFTR 5915, Part I, June 1949.

Strand, O. T., PROTECTIVE HELMET IMPACT TESTING EQUIPMENT, AFTR 5820, 1949.

Strand, O. T., IMPACT EFFECT OF TWO TYPES OF PROTECTIVE HELMETS, AFTR 6020, May 1950.

DeHaven, H., CRASH INJURY RESEARCH, AFTR 6007, September 1950.

DeHaven, H., CRASH DECELERATION, CRASH ENERGY, AND THEIR RELATION-SHIP TO CRASH INJURY, AFTR 6242, December 1950.

DeHaven, H. and Hashbrook, A. H., USE AND EFFECTIVENESS OF SHOULDER HARNESS IN SURPLUS MILITARY AIRCRAFT FLOWN BY CIVILIAN PILOTS, AFTR 6461, February 1951.

Stapp, J. P., "Human Exposure to Linear Decelerative Forces in the Backward Facing Seated Positions," <u>Military Surgeon</u> 109(2):106-108, August 1951.

Brown, G. W., Brown, M. L., and Hines, H. M., CARDIOVASCULAR AND RESPIRATORY CHANGES ASSOCIATED WITH EXPERIMENTAL CONCUSSION IN DOGS, AFTR 6737, October 1951.

Stapp, J. P., HUMAN EXPOSURES TO LINEAR DECELERATION. PART II, THE FORWARD-FACING POSITION AND THE DEVELOPMENT OF A CRASH HARNESS, AFTR 5915, Part II, December 1951.

Stapp, J. P., "Human Tolerance to Deceleration - Summary of 166 Runs," J. Aviation Med. 22:42-45, 1951.

Brown, G. W., Brown, M. L., and Hines, H. M., CHANGES IN BLOOD FLOW ARTERIAL PRESSURE AND CARDIAC RATE ASSOCIATED WITH EXPERIMENTAL CONCUSSION AND ELECTROCONVULSIVE SHOCK, WADC TR 52-265, October 1952.

"Human and Chimpanzee Tolerance to Linear Decelerative Force," Paper presented at conference on "Problems of Emergency Escape in High Speed Flight," 1952.

Dempster, W. T., SPACE REQUIREMENTS OF THE SEATED OPERATOR - GEOMETRI-CAL, KINEMATIC, AND MECHANICAL ASPECTS OF THE BODY WITH SPECIAL REFERENCE TO THE LIMBS, WADC TR55-159, July 1955.

Fasola, A. F., Baker, R. C. and Hitchcock, F. A., ANATOMICAL AND PHYSIO-LOGICAL EFFECTS OF RAPID DECELERATION, WADC TR 54-218, August 1955.

Maciolek, J. A., Salzman, E. W., and Zuidema, G. D., "Comparison of Human Tolerance to Accelerations of Slow and Rapid Onset," <u>J. Aviation Med.</u> 27:482, 1956.

Cohen, S. I., Silverman, A. J., Zuidema, G. D., SKIN RESISTANCE CHANGES DURING ACCELERATION, WADC TN 56-397, April 1958.

Hollister, N. R., Jolley, W. P., Horne, R. G., and Friede, R., BIOPHYSICS OF CONCUSSION, WADC TR 58-193, September 1958.

Hollister, N., Jolley, W. P., and Horne, R. G., INVESTIGATIONS OF THE MECHANICS OF CONCUSSION, WADC TR 58-130, 1958.

- Friede, R. L., The Pathology and Mechanics of Experimental Cerebral Concussion, WADD Technical Report 61-256, (AD 266210, March 1961)
- Freeman, H. E., W. C. Boyce, C. F. Gell, <u>Investigation of a Personnel</u> Restraint System for Advanced Manned Flight Vehicles, AMRL Technical Report 62-128, (AD 296896), December 1962.
- von Gierke, H. E., "Biomechanics of Impact Injury," <u>Impact Acceleration Stress</u>, Publication 977, National Academy of Sciences, National Research Council, 1962.
- Coermann, R. R., "Comparison of the Dynamic Characteristics of Dummies, Animals and Man," <u>Impact Acceleration Stress</u>, Publication 977, National Academy of Sciences, National Research Council, 1962.
- Robinson, F. R. L. Hamlin, W. M. Wolff, R. R. Coermann, "Response of the Rhesus Mon Lateral Impact," <u>Aerospace Medicine</u>, Vol. 34, No. 1, 56-62, January 1993. Also AMRL Technical Report 65-5, (AD 643797).
- Clarke, N. P., E. B. Weis, Jr., and J. W. Brinkley, <u>Lateral Impact Tolerance Studies in Support of Apollo</u>, AMRL Memorandum M-29, February 1963.
- Brinkley, J. W., E. B. Weis, Jr., N. P. Clarke, and W. E. Temple, <u>A Study of</u> the Effect of Five Orientations of the Acceleration Vector on Human Response, AMRL Memorandum M-28, February 1963.
- Clarke, N. P., R. F. Managan, J. W. Brinkley and E. B. Weis, Jr., <u>Human</u> Response to Touchdown Impact of the Apollo Lunar Excursion Module, <u>AMRL Memorandum M-34</u>, March 1963.
- Finwall, P. E., "Analytical Evaluation of Restraining Harness Materials," Proceedings of 7th Annual Stapp Car Crash Conference, November 1963.
- Weis, E. B., Jr, N. P. Clarke, J. W. Brinkley, "Human Response to Several Impact Acceleration Orientations and Patterns," <u>Aerospace Medicine</u>, Vol. 34, No. 12, December 1963.
- von Gierke, H. E. and R. R. Coermann, "The Biodynamics of Human Response to Vibration and Impact," <u>Proceedings of the International Congress of Aviation and Cosmonautical Medicine</u>, Paris, September 1961. <u>Revue de Medicine Aeronautique</u>, Vol 2, 1962. Also <u>Industrial Medicine and Surgery</u>, Vol 32, pp 30-32, 1963.
- Weis, E. B., Jr., P. J. Martin, N. P. Clarke, "Analysis of Force and Acceleration Data From Human Impact Experiments," <u>Proceedings of 16th Annual Conference on Engineering in Medicine and Biology</u>, 80-81, 1963.

- Bright, P. B., <u>Brain Momentum and Experimental Concussion</u>, AMRL Memorandum B-80, August 1964.
- Clarke, N. P., "Acceleration, Vibration and Impact," <u>Bioastronautics</u> Fundamental and Practical Problems, Vol. 17, 79-88, 1964, Western Periodicals Co., N. Hollywood, California.
- Payne, P. R., S. Barrett, <u>Response of a Linear Damped Dynamic System to Selected Acceleration Inputs</u>, <u>AMRL Technical Report 65-40</u>, (AD 616643), <u>April 1965</u>.
- Payne, P. R., "Optimizations of Human Restraint Systems for Short-Period Accelerations," American Society of Mechanical Engineers, No. 63-WA-277, November 1963. Also AMRL Technical Report 65-108, (AD 616960), June 1965.
- Stech, E. L., "A Review of Restraint Systems Test Methods," American Society of Mechanical Engineers, No. 63-WA-279, January 1964. Also AMRL Technical Report 65-109, (AD 618280), June 1965.
- Henzel, J. H., N. P. Clarke, G. C. Mohr, E. B. Weis, Jr., <u>Compression</u> Fractures of Thoracic Vertebrae Apparently Resulting From Experimental Impact, A Case Report, AMRL Technical Report 65-134 (AD 622026), August 1965.
- Payne, P. R., <u>Personnel Restraint and Support System Dynamics</u>, AMRL Technical Report 65-127, (AD 624487), October 1965.
- Wittman, T. J., "An Analytical Model to Duplicate Human Dynamic Response to Impact," ASME 66-WA/BHF-12, 1966. Also cataloged as AMRL Technical Report 66-126.
- von Gierke, H. E., "On the Dynamics of Some Head Injury Mechanisms," <u>Head Injury</u>, W. F. Coveness and A. E. Walker, Editors, J. B. Lippencott Co., Philadelphia/Toronto, 383-396, 1966.
- Weis, E. B., Jr., W. Q. Leysath, K. R. Horning, <u>Development of a Pulsed X-Ray Television Fluroscope for Biodynamic Research</u>, <u>AMRL Technical Report 66-189</u>, (AD 652851), March 1967.
- Carmichael, J. B., Jr., J. H. Henzel, G. C. Mohr, H. E. von Gierke, "On the Measurement of the Transmission of External Force Through Fluid Systems in Primates," Aerospace Medicine, Vol. 38, No. 3, 282-285, March 1967. Also AMRL Technical Report 66-44, (AD 697586), March 1967.
- Managan, R. F., K. C. Flagg, N. P. Clarke, J. H. Duddy, <u>Evaluation of Two Cyclic-Strain Impact Attenuators</u>, AMRL Technical Report 66-221, (AD 657798), May 1967.
- Henzel, J. H., The Human Spinal Column and Upward Ejection Acceleration: An Appraisal of Biodynamic Implications, AMRL Technical Report 66-233, (AD 664553), September 1967.

- Weis, E. B., Jr., G. C. Mohr, "Cineradiographic Analysis of Human Visceral Response to Short Duration Impact," <u>Aerospace Medicine</u>, Vol. 38, No. 10, October 1967. Also AMRL Technical Report 67-39, (AD 698209).
- Nickerson, J. L., M. Drazic, R. Johnson, H. Udesen, K. Turner, "A Study of Internal Movements of the Body Occurring on Impact," Proceedings of 11th Stapp Car Crash Conference, October 1967. Also cataloged as AMRL Technical Report 67-133, (AD 760798).
- Robbins, W. A., G. L. Potter, C. F. Lombard, <u>Development of Support and Restraint Technology</u>, AMRL Technical Report 68-136, (AD 691463), April 1969.
- Stech, E. L., P. R. Payne, <u>Dynamic Models of the Human Body</u>, AMRL Technical Report 66-157, (AD 701383), November 1969.
- Mattingly, T. E., J. R. Felder, C. F. Lombard, <u>Investigation of Vibration and Impact Protection of the Human Head and Neck</u>, <u>AMRL Technical Report 69-112</u>, (AD 702124), <u>December 1969</u>.
- Kazarian, L. E., H. E. von Gierke, "Results of Immobilization and Chelation Studies in Macaca Mulatta, American Journal of Physical Anthropology, Vol. 29, No. 134, 1969.
- Kazarian, L. E., J. W. Hahn, H. E. von Gierke, "Biomechanics of the Vertebral Column and Internal Organ Response to Seated Spinal Impact in the Rhesus Monkey (Macaca Mulatta), Proceedings of the Stapp Car Crash Conference, Vol. 14, pp 121-143, 1970. Also cataloged as AMRL TR 70-85. (AD 727042)
- Bendixen, C. D., Measurement of Head Angular Acceleration During Impact, ARL-TR-70-5, Holloman AFB, New Mexico, March 1970.
- Kazarian, L. E., "Morphologic Changes of Hard Tissue Due to Immobilization and Potential Countermeasures," <u>Proceedings of Bone Measurement Conference</u>, AEC Conference, 700515, Chicago, May 1970.
- Gragg, C. D., C. D. Bendixen, T. D. Clarke, H. S. Klopfenstein, and J. F. Sprouffske, "Evaluation of the Lap Belt and Pre-Inflated Air Bag During Impact With Human Sled Subjects." Proceedings of the 8th Symposium of the Survival and Flight Equipment Association, Las Vegas, Nevada, September 1970.
- Clarke, T. D., J. F. Sprouffske, E. M. Trout, H. S. Klopfenstein, W. H. Muzzy, C. D. Gragg, and C. D. Bendixen, "Baboon Tolerance to Linear Deceleration  $(-G_X)$ : Lap Belt Series." Proceedings of the Fourteenth Stapp Car Crash Conference. New York: Society of Automotive Engineers, Inc., 279-298, 1970, Also AMRL TR 72-44, (AD 741739).
- Gragg, C. D., C. D. Bendixen, T. D. Clarke, H. S. Klopfenstein, and J. F. Sprouffske, "Evaluation of the Lap Belt, Air Bag, and Air Force Restraint System During Impact With Living Human Sled Subjects." Proceedings of the Fourteenth Stapp Car Crash Conference. New York: Society of Automotive Engineers, Inc., 241-262, 1970. Also AMRL TR 72-44 (AD 741731).

- Clarke, T. D., J. F. Sprouffske, E. M. Trout, C. D. Gragg, W. H. Muzzy, and H. S. Klopfenstein, "Baboon Tolerance to Linear Deceleration  $(-G_X)$ : Air Bag Restraint." Proceedings of the Fourteenth Stapp Car Crash Conference. New York: Society of Automotive Engineers, Inc., 1970, pp. 263-278, Also AMRL TR 72-43 (AD 741724).
- Kazarian, L. E., and H. E. von Gierke, "Dynamic Mechanical Properties of Bone as Related to Disuse," Symposium on Biodynamic Models and Their Applications, October 1970, AMRL TR 71-29, (AD 739501).
- von Gierke, H. E., "Effects of Weightlessness and Immobilization on Mechanical Tolerance" in Orbital International Laboratory and Space Sciences Conference, Cloudcroft, New Mexico, September 28 to October 2, 1969, Published by the International Academy of Astronautics, 1970.
- Kazarian, L. E., H. E. von Gierke, "Age and Exercise as Factors Influencing Osteoporosis, Bone Strength and Acceleration Tolerance", AGARD Conference Proceedings No. 82 on Adaptation and Acclimitization in Aerospace Medicine, AGARD, Neuilly-sur-la-Seine, France, 1970. Also AMRL TR 70-74, (AD 726770).
- von Gierke, H. E., "Lumped Parameter Dynamic Models of the Spine" at Workshop on "Bioengineering Approaches to Problems of the Spine," September 12, 1970, Surgery Study Sections, Division of Research Grants, NIH, DHEW.
- Payne, P. R., and E. G. U. Band, <u>A Four-Degree-of-Freedom Lumped Parameter Model of the Seated Human Body</u>, AMRL TR 70-35, January 1971.
- Gragg, C. D., T. D. Clarke, J. F. Sprouffske, H. S. Klopfenstein, and C. D. Bendixen, "The Effect of Air Bag Deployment on Humans During Impact." Proceedings of the 11th Symposium of Experimental Mechanics, University of New Mexico, p. 157, February 1971.
- Clarke, T. D., Gragg, C. D., and D. F. Huelke, "Impact Trauma Resulting From the Air Bag Restraint." American Association of Anatomists, April 1971. Also published in the Anatomical Record.
- Gragg, C. D., T. D. Clarke, and J. F. Sprouffske, "Human Weight Distribution During Impact Lap Belt, Air Bag, and Air Force Harness Restraint Systems." Institute of Environmental Sciences, 17th Annual Meeting, Los Angeles, California, April 1971, Also AMRL 73-103, (AD 769541).
- von Gierke, H. E., "Biodynamic Models and Their Applications," <u>AGARD Conference Proceedings</u> No. 88 on Linear Acceleration (Impact Type), Oporto, Portugal, 23-26 June 1971, Also Journal of the Acoustical Society of America, Vol. 50, No. 6 (Part 1), 1397-1413, 1971. Also AMRL TR 71-51, (AD 736985).
- Kazarian, L. E., D. D. Boyd, H. E. von Gierke, The Dynamic Biomechanical Nature of Spinal Fractures and Articular Facet Derangement, AMRL Technical Report 71-17, August 1971. (AD 731148).

- Sprouffske, J. F., W. H. Muzzy, C. D. Gragg, and T. D. Clarke, "Data Reproducibility During Impact of a Rebuilt Dummy." <u>Proceedings of the Fifteenth Stapp Car Crash Conference</u>. New York: Society of Automotive Engineers, Inc., November 1971.
- Clarke, T. D., C. D. Gragg, J. F. Sprouffske, E. M. Trout, R. M. Zimmerman, and W. H. Muzzy, "Human Head Linear and Angular Accelerations During Impact." Proceedings of the Fiteenth Stapp Car Crash Conference, New York: Society of Automotive Engineers, Inc., November 1971. Also AMRL TR 71-95 (AD 732290).
- von Gierke, H. E., "Disuse Atrophy in Macaca Mulatta and Its Implication for Extended Space Flight" in <u>Hypogravic and Hypodynamic Environments</u> (R. M. Murray and M. McCally, editors) National Aeronautics and Space Administration Report NASA SP-269, 1971.
- Phillips, N. S., R. S. Scranton, and R. W. Carr, <u>Impact and Vibration Test Equipment Design and Experimentation</u>. Aerospace Medical Research Laboratory Technical Report No. AMRL TR 71-62, December 1971.
- Liu, Y. K., S. C. Cowin, D. U. von Rosenberg, and K. A. Adams, <u>A Continuum Model of the Primate Body Response to Impact</u>, <u>AMRL TR 71-99</u>, <u>January 1972</u>, (AD 739249).
- Sprouffske, J. F., T. D. Clarke, C. D. Gragg, E. M. Trout, and W. H. Muzzy, "Evaluation of the Lap Belt, Air Force Shoulder Harness Lap Belt and Air Bag Plus Lap Belt Restraints During Impact With Anthropomorphic Dummies." Aerospace Medicine, Vol 43, No 4, 368-371, April 1972. Also AMRL TR 71-86, (AD 741530).
- Greer, C. R. and C. D. Gragg, "Experimental Evaluation of the Deployment of an Air Bag Restraint Using Human Subjects (Stationary Body Buck)." Department of Transportation Technical Report No. DOT HS 800 668, May 1972 (AMRL TR 71-124, 10 December 1971). Interagency Agreement No. DOT-HS-017-1-017-IA.
- Russell, H. C. and J. W. Brinkley, "Air Bag Protection Devices: Automotive Systems Tests and Potential Aircraft Applications." Tenth Annual Symposium of Survival and Flight Equipment Association, October 1972.
- Clarke, T. D., D. C. Smedley, W. H. Muzzy, C. D. Gragg, R. E. Schmidt, and E. M. Trout, "Study of Impact Tolerance and Resulting Injury Pattern in the Baboon: Air Force Shoulder Harness Lap Belt Restraint." Proceedings of the Sixteenth Stapp Car Crash Conference, New York: Society of Automotive Engineers, Inc. (to be published).
- Greer, C. R. and H. C. Russell, "Impact Tests of Human Subjects Using a Prototype Air Bag Restraint System." Final Report, Contract No. DOT-HS-017-1-017-IA, Report No. DOT-HS-8-800-805, December 1972. Also AMRL TR 72-97.
- Horner, T. W. and F. W. Hawker, A Statistical Study of Grip Retention Force. AMRL TR 72-110, May 1973, (AD 767904).

Liu, Y. K., "The Effects of Caudocephalad ( $+G_Z$ ) Acceleration on the Initially Curved Spine," Computers in Biology and Medicine, November 1972.

von Gierke, H. E., "Biomechanics: Body Motions under External Forces and Internal Control." Proceedings of the 5th Congress of the Deutsche Gesellschaft fuer Kybernetik, pp 349-367, Nurenberg, Germany, 28-30 March 1973. Also AMRL TR-73-23 (ADA015272).

Krause, H. E., H. L. Oestreicher, H. L. Vogt, H. T. Mohlman, "Minimization Methods in the Development of Biodynamics Models," Proceedings of 21st International Congress of Aviation and Space Medicine, Munich, Germany, 17-21 September 1973. Also AMRL-TR-73-86 (AD 770992).

Kazarian, L. E. and H. E. von Gierke, "The Subhuman Primate as a Tool for Spinal Injury Research." Presented at the XXI Internationaler Kongress fuer Luft and Raumfahrtmedizin, September 1973. Also AMRL-TR-73-97.

Liu, Y. K., G. Ray, A Finite Element Analysis of Wave Propagation in Human Spine, AMRL-TR-73-40, Nov 73 (AD 773858).

Liu, Y. K., J. K. Wickstrom, "Estimation of the Inertial Property Distribution of the Human Torso from Segmented Cadavenic Data." Perspectives in Biomedical Engineering, R. M. Kenedi, Ed., Univ. of Strathclyde, 1973.

Liu, Y. K., H. Cramer, D. R. Von Rosenberg, A Distributed Parameter Model of the Inertially Loaded Human Spine: A Finite Difference Solution. AMRL-TR-73-65, Nov 73 (AD 773895).

Phillips, N. S., R. W. Carr, T. J. Wittman and R. S. Scranton, An Investigation of Automatic Restraint and Body Positioning Techniques, AMRL-TR-71-101, Dec 73 (AD 773857).

Kazarian, L. E., "Dynamic Response Characteristics of the Human Vertebral Column - An Experimental Study on Human Autopsy Specimens." Monograph No. 146, Acta Orthopaedica Scandinavica, Munksgaard, Copenhagen, 1973. Also AMRL-TR-74-6 (AD 917796).

Brinkley, J. W., H. E. von Gierke, "Impact Acceleration," Joint USA/USSR Publication entitled Foundations of Space Biology and Medicine, Vol 2, Book 1, Part 2, Chapter 6, pp 214-246, 1975.

NASA Special Publication No. 374. Also AMRL-TR-73-68 (AD 771612)

von Gierke, H. E., "Man to Model or Model to Man?" Proceedings XXI International Congress of Aviation and Space Medicine, Munich, West Germany, 1973. Also AMRL-TR-73-96 (AD 771670).

- von Gierke, H. E., "Dynamic Characteristics of the Human Body," Perspectives in Biomedical Engineering, pp 193-202, 1973. Also AMRL-TR-72-53 (AD 769022).
- Phillips, N. S., R. W. Carr, R. S. Scanton, L. D. Galbraith, Design of Escape Lateral Landing Impact Protection Systems, AMRL-TR-73-21, Jan 74 (AD 776066).
- Noyes, F. R., J. L. DeLucas, P. J. Torvik, "Biomechanics of Anterior Cruciate Ligament Failure: An Analysis of Strain-Rate Sensitivity and Mechanisms of Failure in Primates." <u>Journal of Bone and Joint Surgery</u>, 56-A No. 2, pp 236-253, Mar 74. Also AMRL-TR-73-117 (AD A018832).
- Noyes, F. R., P. J. Torvik, W. B. Hyde, "Biomechanics of Ligament Failure II: An Analysis of Immobilization, Exercise and Reconditioning Effects in Primates," <u>Journal of Bone and Joint Surgery</u>, 56-A, No. 7, pp 1406-1418, Oct 74. Also AMRL-TR-74-40 (AD A011317)
- Chan, H. S., Mathematical Model of Head Injury Due to Axisymmetric Impact, AMRL-TR-74-27, Nov 74 (AD AO 04775).
- Kazarian, L. E., "Creep Characteristics of the Human Spinal Column," Orthopedic Clinics of North America, Vol 6, No. 1, Jan 75. Also AMRL-TR-75-28 (ADA013451).
- Hubick, H. O., H. W. Schuette, D. J. Palughi, A. C. Powell, F. J. Schroeder, Design of AMRL Impact Facility Sled, Propulsion Unit and Decelerator, AMRL-TR-74-118 Jan 75 (AD A005704).
- Fleck, J. T., F. E. Butler, "Development of an Improved Computer Model of the Human Body and Extremity Dynamics,"AMRL-TR-75-14, Jul 75 (AD A014816).
- Kaleps, I., "Thoracic Dynamics During Blunt Impact." Proceedings of the Aircraft Crashworthiness Symposium, 6-8 Oct 75, Cincinnati, Ohio. Also AMRL-TR-75-46.
- Kazarian, L. E., "Standardization and Interpretation of Spinal Injury Criteria," Proceedings of the Aircraft Crashworthiness Symposium, Cincinnati, Ohio, Oct 75. Also AMRL-TR-75-85.
- Backaitis, S., et al, "Performance Evaluation of Child Dummies and Baboons in Child Restraint Systems in a Systematized Crash Environment," Proceedings of the 19th Stapp Car Crash Conference, San Diego, California, 17-19 Nov 75. Also AMRL-TR-75-100.
- Kazarian, L. E., "The Primate as a Model for Crash Injury," Proceedings of the 19th Stapp Car Crash Conference, (931-963) San Diego, California, 17-19 Nov 75. Also AMRL-TR-75-101 (AD A027809).

Shaffer, J. T., The Impulse Accelerator: An Impact Sled Facility for Human Research and Safety Systems Testing, AMRL-TR-76-8, Aug 76 (AD A030534).

### SECTION II

#### VIBRATION

Fitts, P. M., PRELIMINARY STUDIES ON THE EFFECT OF VIBRATION, ILLUMINATION AND TYPE SIZE ON LEGIBILITY OF NUMERALS, TSEAA-694-1F, 23 June 1947.

Eldrege, D. H., Parrack, H. O., and Koster, H. F., PHYSIOLOGY EFFECTS OF INTENSE SOUND, MCREXD 695-71B, May 1948.

Franke, E., MEASUREMENT OF THE MECHANICAL IMPEDANCE OF THE BODY SURFACE, MCREXD-695-71C, 7 June 1948.

Fitts, P. M., STUDIES OF THE EFFECT OF TYPOGRAPHICAL SPACING ON THE LEGIBILITY OF NUMERALS UNDER VIBRATION, MCREXD-694-1Q, 23 December 1948, (Attachment - Report No. 5 - EFFECT OF VIBRATION ON LEGIBILITY OF TABULAR NUMERICAL MATERIAL - EXPERIMENTS 8 AND 9, Crook, M. N., Harker, G. S., and Hoffman, A. C., October 1948).

Fitts, P. M., Crook, N. M., Harker, G. S., Hoffman, A. C., Wulfeck, J. W., A DETERMINATION OF AMPLITUDE THRESHOLDS FOR THE VISUAL PERCEPTION OF VIBRATION, MCREXD-694-1R, 21 February 1949.

Davis, H., Parrack, H. O., and Eldrege, D. H., "Hazards of Intense Sound and Ultrasound," Annals of Otology, Rhinology and Laryngology, September 1949.

Eldrege, D. H., and Parrack, H. O., "Biological Effects of Intense Sound," J. Acoustical Soc. America 21:55, 1949.

von Gierke, H. E., MEASUREMENT OF THE ACOUSTIC IMPEDANCE AND THE ACOUSTIC ABSORPTION COEFFICIENT OF THE SURFACE OF THE HUMAN BODY, AF Technical Report No. 6010, March 1950.

Oestreicher, H. L., A THEORY OF THE PROPAGATION OF MECHANICAL VIBRATIONS IN HUMAN AND ANIMAL TISSUE, AFTR 6244, November 1950.

Parrack, H. O., von Gierke, H. E., Oestreicher, H., and von Wittern, W. W., "Absorption of Vibratory Energy by Human Body Surface," <u>Fed. Proceedings</u> 9:99-100, 1950.

Franke, E. K., von Gierke, H. E., Oestreicher, H. L., Parrack, H. O., PHYSICS OF VIBRATION IN LIVING TISSUE, AFTR 6367, February 1951 (also in <u>J. Appl. Physiol.</u> Vol. 4, No. 12, June 1952).

Franke, E. K., MECHANICAL IMPEDANCE MEASUREMENT OF THE HUMAN BODY SURFACE, AFTR 6469, August 1951.

Franke, E. K., "Mechanical Impedance of the Surface of the Human Body," J. Appl. Physiol. 3(10):582-590, April 1951.

Franke, E. K., von Gierke, H. E., Oestreicher, H. L. and von Wittern, W. W. THE PROPAGATION OF SURFACE WAVES OVER THE HUMAN BODY, AF Technical Report No. 6464, June 1951.

Oestreicher, H. L., "Field and Impedance of an Oscillating Sphere in a Viscoelastic Medium with Applications to Biophysics. <u>J. Acoustical Soc. America</u> 23:707-714, 1951.

Franke, E. K., "Impedance of the Human Mastoid," J. Acoustical Soc. America 24:410, 1952.

von Wittern, W. W., "Ballistocardiography with Elimination of the Influence of the Vibration Properties of the Body," American Heart Journal, 46(5):705-714, November 1953.

Ades, H. W., Davis, H., Eldridge, D. H., von Gierke, H. E., et al., BENOX REPORT: AN EXPLORATORY STUDY OF THE BIOLOGICAL EFFECTS OF NOISE, AD 24685, 1953.

Ackerman, E., Reid, J. J., Kinsloe, H., and Frings, H. W., BIOLOGICAL EFFECTS OF HIGH - INTENSITY SOUND WAVES, WADC TR 53-82, 1953.

Franke, E. K., THE RESPONSES OF THE HUMAN SKULL TO MECHANICAL VIBRATIONS, WADC TR 54-24, November 1954.

Steele, J. E., MOTION SICKNESS, Supplement to <u>Shock and Vibration Bulletin</u> No. 22, July 1955.

Franke, E. K., and Hildreth, K. M., LOCAL VASCULAR RESPONSE TO VIBRATIONS, WADC TN 56-297, July 1956.

Parrack, H. O., "Noise, Vibration and People," <u>Noise Control</u> 2(6):10-24, November 1956.

Eldred, K. M., Gannon, W. J., and von Gierke, H. E., CRITERIA FOR SHORT TIME EXPOSURE OF PERSONNEL TO HIGH INTENSITY JET AIRCRAFT NOISE, WADC TN 55-355, 1956.

Ackerman, E., Anthony, A., Berger, R. L., et al., SOUND ABSORPTION AT THE SURFACES OF SMALL LABORATORY ANIMALS, WADD TR 57-461, June 1957.

von Gierke, H. E., "Transmission of Vibratory Energy through Human Body Tissue," Proceedings of the First National Biophysics Conference, 1957.

Anthony, A., and Ackerman, E., BIOLOGICAL EFFECTS OF NOISE IN VERTEBRATE ANIMALS, WADD TR 57-647, 1957.

Roman, J., EFFECTS OF WHOLE BODY VIBRATION ON MICE AND METHODS OF PROTECTION FROM VIBRATION INJURY, WADC TR 58-107, April 1958.

Hueter, T. F., VISCO-ELASTIC LOSSES IN TISSUES IN THE ULTRASONIC RANGE, WADC Technical Report 57-706, August 1958.

Wulfeck, J. W., Weisz, A., and Raben, M. W., VISION IN MILITARY AVIATION ("Effects of Vibration on Visual Performance," pp 289-293), WADC TR 58-399, November 1958.

von Gierke, H. E., VIBRATION AND NOISE ENVIRONMENTS OF MISSILES AND SPACECRAFT, WADC Technical Report 59-732, Section 5 "Space Medicine." Proceedings of the WADC Space Technology Lecture Series, December 1958.

Randle, R. J., Jr., Vibrations in Helicopters: Training Considerations, AMRL TN 59-61, March 1959 (AD 212314).

von Gierke, H. E., "Vibration and Noise Problems Expected in Manned Space Craft," Noise Control, Vol. 5, pp 8-16, May 1959.

Ziegenruecker, G. H. and E. B. Magid, <u>Short Time Human Tolerance to Sinusoidal Vibrations</u>, WADC Technical Report 59-391, (AD 227341), July 1959.

von Gierke, H. E., "Transmission of Vibratory Energy Through Human Body Tissue," Proceedings of the First National Biophysics Conference, 1957, Yale University Press, 1959.

Goldman, D. and H. E. von Gierke, The Effects of Shock and Vibration on Man, Naval Medical Research Institute Report 60-3, January 1960.

Coermann, R. R., G. H. Ziegenruecker, A. L. Wittwer, and H. E. von Gierke, "The Passive Dynamic Mechanical Properties of the Human Thorax-Abdomen System and of the Whole Body System," <u>Aerospace Medicine</u>, Vol 31, pp 443-455, June 1960.

Magid, E. B., R. R. Coermann, and G. H. Ziegenruecker, "Human Tolerance to Whole Body Sinusoidal Vibration. Short-Time, One-Minute and Three-Minute Studies," Aerospace Medicine, Vol 31, pp 915-924, November 1960.

Magid, E. B. and R. R. Coermann, "The Reaction of the Human Body to Extreme Vibrations," Proceedings of the Institute of Environmental Sciences, National Meeting, pp 135, 1960.

Coermann, R. R., The Mechanical Impedance of the Human Body in Sitting and Standing Position at Low Frequencies, ASD Technical Report 61-492, September 1961. Also Human Factors, Vol 4, 1962.

von Gierke, H. E. and D. E. Goldman, "Shock and Vibration: Limits of Comfort and Safety," Handbook of Shock and Vibration, McGraw-Hill Book Co., New York, 1961.

Modignani, L., L. Renato, B. D. Blivaiss, and E. G. Magid, "Effect of All Body Vibration on Plasmatic and Urinary Corticosteroid Levels," <u>Proceedings of International Congress on Hormonal Steroids</u>, Milano, Italy, May 1962.

Blivaiss, B. D., L. M. Renato, and P. Inna, "Plasma 17-Hydroxycorticosteroids in Dogs After Whole Body Vibration," <u>Proceedings of International Congress on Hormonal Steroids</u>, Milano, Italy, May 1962.

Mandel, M. J., Effect of Sinusoidal Vertical Vibration on the Urinary Sediment in Man, MRL Technical Documentary Report 62-63, June 1962.

- Magid, E. B., R. R. Coermann, R. D. Lowry, and W. Bosley, <u>Physiological and Mechanical Response of the Human to Longitudinal Whole-Body Vibration as Determined by Subjective Response</u>, <u>AMRL Technical Documentary Report 62-66</u>, <u>June 1962</u>.
- Nickerson, J. L. and R. R. Coermann, <u>Internal Body Movements Resulting From Externally Applied Sinusoidal Forces</u>, <u>AMRL Technical Documentary Report 62-81</u>, <u>July 1962</u>.
- Mandel, M. J. and R. D. Lowry, One Minute Tolerance in Man to Vertical Sinusoidal Vibration in the Sitting Position, AMRL Technical Documentary Report 62-121, October 1962.
- Mandel, M. J., F. R. Robinson, and E. A. Luce, "SGOT Levels in Man and the Monkey Following Physical and Emotional Exertion," <u>Aerospace Medicine</u>, Vol 33, pp 1216-1223, October 1962.
- Clark, W. S., K. O. Lange, and R. R. Coermann, "Deformation of the Human Body Due to Uni-Directional Forced Sinusoidal Vibration," <u>Human Factors</u>, Vol 4, No. 5, October 1962.
- White, G. H. Jr., K. O. Lange, and R. R. Coermann, "The Effects of Simulated Buffeting on the Internal Pressure of Man," <u>Human Factors</u>, pp 275-290, October 1962.
- Coermann, R. R., E. B. Magid and K. O. Lange, "Human Performance Under Vibrational Stress," Human Factors, pp 315-324, October 1962.
- Lange, K. O. and R. R. Coermann, "Visual Acuity Under Vibration," <u>Human</u> Factors, pp 291-300, October 1962.
- Nixon, C. W., "Influence of Selected Vibration Upon Speech, I. Range of 10 cps to 50 cps," Journal of Auditory Research, Vol 2, pp 247-266, 1962.
- Mandel, M. J., "Short Time Tolerance in Man to Sinusoidal Vibrations," Aerospace Medicine, Vol. 34, No. 2, February 1963.
- Crook, R. F., "Design of a Six Degree of Freedom Vibration Simulator," Proceedings of Institute of Environmental Science, April 1963.
- Sharp, T. D., "A Live Load Force Table," Proceedings of Institute of Environmental Science, April 1963.
- Nixon, C. W., H. C. Sommer, Influence of Selected Vibrations Upon Speech II (Range of 2 cps 20 cps and Random), AMRL Technical Report 63-49, (AD 416816), June 1963.
- Nixon, C. W., H. C. Sommer, "Influence of Selected Vibrations Upon Speech III: Range of 6 cps to 20 cps for Semi-Supine Talkers," <u>Aerospace Medicine</u>, Vol. 34, No. 11, November 1963.

- Kraus, H. E., K. O. Lange, "The Nonlinear Behavior of Biomechanical Systems," Proceedings of American Society of Mechanical Engineers, November 1963.
- Nickerson, J. L., M. Drazic, Young's Modulus and Breaking Strength of Body Tissues, AMRL Technical Report 64-23, (AD 601181), March 1964.
- Nickerson, J. L., A Study of the Effects of Anesthesia, High Oxygen and Feeding Upon the Resonant Frequencies of Visceral Organs, AMRL Technical Report 64-14, (AD 601180), April 1964.
- Blivaiss, B. B., E. B. Magid, R. Litta-Modignani, <u>Effects of Whole-Body</u> Vibrations on Plasma and Urinary Corticosteroid <u>Levels in Man</u>, AMRL Technical Report 64-53, (AD 606034), June 1964.
- Blivaiss, B. B., R. Litta-Modignani, R. Galansino, P. Foa, <u>Endocrine and Metabolic Response of Dogs to Whole-Body Vibration</u>, AMRL Technical Report 64-54, (AD 606054), June 1964.
- Taub, H. A., The Effects of Vibration on Dial Reading Performance, AMRL Technical Report 64-70 (AD 603963), July 1964.
- Nickerson, J. L., A. Paradijeff, <u>Body Tissue Changes in Dogs Resulting From Sinusoidal Oscillation Stress</u>, AMRL Technical Report 64-58, (AD 607758), August 1964.
- Temple, W. E., N. P. Clarke, J. W. Brinkley, M. J. Mandel, "Man's Short Time Tolerance to Sinusoidal Vibration," <u>Aerospace Medicine</u>, Vol. 35, No. 10, October 1964. Also AMRL Technical Report 65-96, (AD 617011), June 1965.
- Edwards, R. G., K. O. Lange, <u>A Mechanical Impedance Investigation of Human</u> Response to Vibration, AMRL Technical Report 64-91, (AD 609006), October 1964.
- Weis, E. B., Jr., N. P. Clarke, J. W. Brinkley, P. J. Martin, "Mechanical Impedance as a Tool in Research on Human Response to Acceleration," Aerospace Medicine, Vol. 35, No. 10, October 1964. Also AMRL Technical Report 65-7 (AD 611946).
- von Gierke, H. E., "Transient Acceleration, Vibration and Noise Problems in Space Flight," <u>Bioastronautics</u>, K. E. Schaefer, Editor, The MacMillan Co., 1964.
- Clarke, N. P., "Acceleration, Vibration and Impact," <u>Bioastronautics</u> Fundamental and Practical Problems, Vol. 17, 79-88, 1964, Western Periodicals Co., N. Hollywood, California.

- Primiano, F. P., Jr., R. D. Lowry, N. P. Clarke, <u>Distortion Analysis of the Acceleration Produced by the Western Gear Corporation Model 4010 High Amplitude Vibration Machine</u>, AMRL Technical Report 65-27, (AD 620319), April 1965.
- Clarke, N. P., H. Taub, H. F. Scherer, W. E. Temple, <u>Preliminary Study of Dial Reading Performance During Sustained Acceleration and Vibration</u>, AMRL Technical Report 65-110, (AD 622298), August 1965.
- von Gierke, H. E., "On Noise and Vibration Exposure Criteria," <u>Archives of Environmental Health</u>, Vol. II, 327-339, September 1965. Also AMRL Technical Report 65-84, (AD 628175).
- Clarke, N. P., G. C. Mohr, J. W. Brinkley, P. J. Martin, H. C. Wooding, J. H. Henzel, H. E. von Gierke, "Evaluation of Peak vs RMS Acceleration in Periodic Low Frequency Vibration Exposures," <u>Aerospace Medicine</u>, Vol. 36, No. 11, November 1965. Also AMRL Technical Report 65-67, (AD 630785).
- Harris, C. S., R. W. Shoenberger, <u>Human Performance During Vibration</u>, AMRL Technical Report 65-204 (AD 624196), November 1965.
- Weisz, A. Z., C. Goddard, R. W. Allen, <u>Human Performance Under Random and Sinusoidal Vibration</u>, AMRL Technical Report 65-209, (AD 631457), December 1965.
- Nickerson, J. L., H. Pevsner, R. Johnson, H. Udesen, "Vibration Transmission Between Heart and Ballistocardiograph," <u>Proceedings of the 1st World Congress on Ballistocardiograph</u>, <u>Cardiovascular and Dynamics</u>, <u>Amsterdam</u>, 49-54, 1965. Also AMRL Technical Report 65-94, (AD 695972).
- Taub, H. A., Dial-Reading Performance as a Function of Frequency of Vibration and Head Restraint System, AMRL Technical Report 66-57, (AD 636317), April 1966.
- Weis, E. B., Jr., N. P. Clarke, H. E. von Gierke, Mechanical Impedance as a Tool in Biomechanics, AMRL Technical Report 66-84, (AD 638792), June 1966. Also ASME 63-WA-280, November 1963.
- Nickerson, J. L., M. Drazic, <u>Internal Body Movement Along Three Axes Resulting</u> From Externally Applied Sinusoidal Forces, AMRL Technical Report 66-102, (AD 641135), July 1966.
- Henzel, J. H., N. P. Clarke, G. C. Mohr, "Effect of Anterior Intercostal Nerve Block on the Threshold of Thoracic Pain Associated With Gz and Gx Vibration," Aerospace Medicine, Vol. 37, No. 7, July 1966. Also AMRL Technical Report 65-68, (AD 638719).
- Weis, E. B., Jr., F. P. Primiano Jr., "The Motion of the Human Center of Mass and Its Relationship to the Mechanical Impedance," Human Factors, 399-405, October 1966. Also AMRL Technical Report 65-50, (AD 637182).
- Holland, C. L., Jr., Performance and Physiological Effects of Long-Term Vibration, AMRL Technical Report 66-145, (AD 649366), October 1966.

- Harris, C. S., R. W. Shoenberger, "Effects of Frequency of Vibration on Human Performance," <u>Journal of Engineering Psychology</u>, Vol. 5, No. 1, 1966. Also cataloged as AMRL Technical Report 66-152, (AD 698068).
- Mohr, G. C., H. E. von Gierke, "Human Reactions to Mechanical Vibrations," Handbook on Environmental Biology, Federation of American Societies for Experimental Biology, 1966.
- Carmichael, J. B., Jr., J. H. Henzel, G. C. Mohr, H. E. von Gierke, "On the Measurement of the Transmission of External Force Through Fluid Systems in Primates," Aerospace Medicine, Vol. 38, No. 3, 282-285, March 1967. Also AMRL Technical Report 66-44, (AD 697586), March 1967.
- Rubenstein, L., H. A. Taub, <u>Visual Acuity During Vibration as a Function of Frequency</u>, <u>Amplitude and Subject-Display Relationship</u>, <u>AMRL Technical Report 66-181</u>, (AD 658440), June 1967.
- Clarke, N. P., W. M. Wolff, J. J. Gokelman, H. E. von Gierke, "Simulation of Aerospace Flight Acceleration and Dynamic Pressure Environments for Biodynamics Research," Journal of Spacecraft and Rockets, Vol. 4, No. 6, 751-757, June 1967. Also cataloged as AMRL Technical Report 66-249, (AD 708607).
- Parker, D. E., W. P. Covell, "Behavioral Loss and Otoconia Displacement in Guinea Pigs Following Linear Acceleration," Revista Panamericana de Otorrinolaringologica y Broncoesfagologia, Vol. 1, No. 1, July August 1967.
- Calcaterra, P. C., D. W. Schubert, <u>Research on Active Vibration Isolation</u> Techniques for Aircraft Pilot Protection, AMRL Technical Report 67-138, (AD 664090), October 1967.
- Rubenstein, L., R. Kaplan, Some Effects of Y-Axis Vibration on Visual Acuity, AMRL Technical Report 68-19, (AD 673378), November 1967.
- Shoenberger, R. W., "Effects of Vibration on Complex Psychomotor Performance," Aerospace Medicine, Vol. 38, No. 12, 1264-1269, December 1967. Also cataloged as AMRL Technical Report 67-40.
- Shoenberger, R. W., <u>Investigation of the Effects of Vibration on Dial Reading</u> Performance With a NASA Prototype Apollo Helmet, AMRL Technical Report 67-205, (AD 669357), February 1968.
- von Gierke, H. E., "Response of the Body to Mechanical Forces An Overview," Annals of the New York Academy of Sciences, Vol. 152, Art. 1, (172-186), October 1968. Also cataloged as AMRL Technical Report 66-251. (AD 725202).
- Moore, T. J., "Vibratory Stimulation of the Skin by Electrostatic Field: Effects of Size of Electrode and Site of Stimulation on the Thresholds," American Journal of Psychology, Vol. 81, No. 2, 235-240, November 1968. Also AMRL Technical Report 67-20, (AD 698219).

- Parker, D. E., W. P. Covell, H. E. von Gierke, "Exploration of Vestibular Damage in Guinea Pigs Following Mechanical Stimulation," Supplement 239, Acta Oto-Laryngologica, Uppsala, 1968. Also cataloged as AMRL Technical Report 66-170.
- Mattingly, T. E., J. R. Felder, C. F. Lombard, <u>Investigation of Vibration</u> and <u>Impact Protection of the Human Head and Neck</u>, <u>AMRL Technical Report</u> 69-112, (AD 702124), <u>December 1969</u>.
- O'Briant, C. R., M. K. Ohlbaum, "Visual Acuity Decrements Associated With Whole-Body +Gz Vibration Stress," Aerospace Medicine, Vol. 41, No. 1, 79-82, January 1970. Cataloged as AMRL Technical Report 69-90, (AD 704251).
- Moore, T. J., "Mechanical Characteristics of Skin and Tissue in Response to Vibratory Stimulation," IEEE Transactions on Man-Machine Systems, Vol. MMS-11, No. 1, March 1970. Cataloged as AMRL Technical Report 69-25.
- Hille, H. K., J. F. Rose, Jr., L. K. Kettler, Portable Instrument Package (PORTAPAK) for the Measurement of Noise and Vibration, AMRL Technical Report 69-75, (AD 707826), March 1970.
- Harris, C. S., R. W. Shoenberger, Combined Effects of Noise and Vibration on Psychomotor Performance, AMRL Technical Report 70-14, (AD 710595) May 1970.
- Shoenberger, R. W., C. S. Harris, H. E. von Gierke, <u>Perception of Ultra-Low Frequency Sinusoidal Proprioceptive Stimuli</u>, AMRL Technical Report 69-81, (AD 711045), June 1970.
- Sommer, H. C., C. S. Harris, Combined Effects of Noise and Vibration on Mental Performance as a Function of Time of Day, AMRL Technical Report 70-36, (AD 711636), July 1970.
- von Gierke, H. E., "Biodynamic Effects on Low Altitude Flight Control Problems," Proceedings of AGARD Symposium on Low Altitude Flight Control Problems, Brussels, Belgium, September 1970. Also cataloged as AMRL TR-70-67.
- von Gierke, H. E., "Lumped Parameter Dynamic Models of the Spine" at Workshop on "Bioengineering Approaches to Problems of the Spine," September 12, 1970, Surgery Study Sections, Division of Research Grants, NIH, DHEW.
- Wilburn, D. L., J. L. Kurzenberger, <u>Kinematic Analysis of a Six Degree of Freedom Vibration Table</u>, AMRL Technical Report 70-87, September 1970.
- Shoenberger, R. W., Human Performance as a Function of Direction and Frequency of Whole Body Vibration, AMRL Technical Report 70-7, October 1970.
- von Gierke, H. E., N. P. Clarke, "Effects of Vibration and Buffeting," Aerospace Medicine, (H. W. Randel, Editor), Williams and Wilkins Co., Baltimore, Md., 1970.

Broderson, A. B., "A Preliminary Investigation of Mechanical Vibration Effects on Abdominal Organ Temperatures in the Primate," <u>Proceedings</u>, 23rd <u>Annual</u> Conference on Engineering in Medicine and Biology, Washington, D. C., 15-19 November 1970. Also AMRL TR 70-51, (AD 770765).

Ohlbaum, M. K., C. R. O'Briant, H. E. von Gierke, "Comparative Effects of Vibration on Monocular and Binocular Vision," <u>Aerospace Medicine</u>, Vol. 42, No. 1, 36-41, January 1971. Also cataloged as AMRL Technical Report 70-89.

Shoenberger, R. W., C. S. Harris, "Psychophysical Assessment of Whole-Body Vibration," <u>Human Factors</u>, 1971, 13(1), 41-50, February 1971. Also cataloged as AMRL Technical Report 69-87, (AD 724360).

Speakman, J. D., J. F. Rose, Jr., <u>Crew Compartment Vibration Environment in the B-52 Aircraft During Low-Altitude</u>, <u>High-Speed Flight</u>, <u>AMRL Technical Report 71-12</u>, <u>March 1971</u>.

Ohlbaum, M., C. R. O'Briant, R. Van Patten, "The Effects of Viewing Distance on the Visual Decrements Associated with  $G_Z$  Vibration," <u>Journal of the American Academy of Optometry</u>, 298-306, April 1971. Also AMRL Technical Report 70-6.

von Gierke, H. E., "Biodynamic Models and Their Applications," <u>AGARD Conference Proceedings</u>, No. 88 on Linear Acceleration (Impact Type) held in Oporto, Portugal, 23-26 June 197!, AMRL TR 71-51. (AD 736985).

Speakman, J. D., J. F. Rose, Jr., <u>Crew Compartment Vibration Environment in the B-58 Aircraft During Low-Altitude</u>, <u>High-Speed Flight</u>, <u>AMRL Technical Report 71-20</u>, July 1971. (AD 730288).

Harris, C. S., H. C. Sommer, Combined Effects of Noise and Vibration on Mental Performance, AMRL Technical Report 70-21, August 1971. (AD 731146).

Grether, W. F., C. S. Harris, G. C. Mohr, C. W. Nixon, M. Ohlbaum, H. C. Sommer, V. H. Thaler, J. H. Veghte, "Effects of Combined Heat, Noise, and Vibration Stress on Human Performance and Physiological Functions," Aerospace Medicine, Vol. 42, No. 10, 1092-1097, October 1971. Also cataloged as AMRL Technical Report 71-19.

von Gierke, H. E., <u>Physiological and Performance Effects on the Aircrew During Low-Altitude High-Speed Flight Missions</u>, <u>AMRL TR 70-67</u>, <u>November 1971</u>. (AD 737827). Also presented to AGARD Guidance and Control Panel Meeting on "Low-Altitude Flight Control Problems," Brussels, Belgium, 1-3 Sep 70.

Broderson, A. B., H. E. von Gierke, "Mechanical Impedance and Its Variation in the Restrained Primate During Prolonged Vibration," ASME, 71-WA/BHF-8, 1971. Also AMRL Technical Report 71-67, (AD 735380).

- Shoenberger, R. W., "Human Response to Whole-Body Vibration," Perceptual and Motor Skills, Monograph Supplement 1-V34, 1972. Also AMRL TR 71-68, (AD 737777).
- Broderson, A. B., "Biothermal Response of the Rhesus Monkey to Mechanical Vibration," Proceedings, Aerospace Medical Association Annual Meeting, Bal Harbour, Fla., May 8-12, 1972.
- Allen, R. Wade, Henry R. Jex and Raymond E. Magdaleno, "Vibration Effects on Manual Control Performance," presented at the Eighth Annual NASA-University Conference on Manual Control, May 1972. Also AMRL TR 72-47.
- Broderson, A. B., H. E. von Gierke, and J. C. Guignard, "Ride Evaluation in Aerospace and Surface Vehicles," presented at NASA Vehicle Ride Quality Symposium, Langley, Va., July 6-7, 1972, to be published as a NASA Technical Memorandum. Also AMRL TR 72-57.
- Floyd, W. W., A. B. Broderson, and J. F. Goodno, "The Effect of Whole-Body Vibration on Peripheral Nerve Conduction Time in the Rhesus Monkey," submitted to Aerospace Medicine, 22 Aug 1972. Also AMRL 72-73.
- Lafferty, J. F., Edwards, R. G., McCoy, D. F., McCutcheon, E. P., and Wekstein, D. R., A Standard Psychophysiological Preparation for Evaluating the Effects of Environmental Vibration Stress, Phase I: Development, AMRL TR 72-112, March 1973. (AD 759265). Also presented as a paper at the 19th Annual Meeting of the Institute of Environmental Science at Anaheim, California, 3 April 1973.
- Shoenberger, R. W. and Wilburn, D. L., <u>Tracking Performance During Whole-Body Vibration With Side-Mounted and Center-Mounted Control Sticks</u>, AMRL TR 72-120, April 1973, (AD 761798).
- Broderson, A. B., <u>Measurement</u>, <u>Evaluation</u>, <u>Prediction</u> and <u>Improvement of Aircraft Ride</u>, AMRL TR 73-4, August 1973. (AD 783803)
- Carmichael, J. B., H. E. von Gierke, "Biodynamic Applications Regarding Isolation of Humans From Shock and Vibration," <u>Isolation of Mechanical Vibration</u>, <u>Impact and Noise</u>. ASME-AMD-Vol. 1, Section 10, 246-270. ASME Design Engineering Technical Conference, Cincinnati, Ohio, September 1973. Also AMRL TR 73-72, (AD 770316).
- Allan, R. W., H. R. Jex, R. E. Magdaleno, Manual Control Performance and Dynamic Response During Sinusoidal Vibration, AMRL TR 73-78, October 1973, (AD 773844).
- Shoenberger, R. W., A Comparison of Judgements of Vibration Intensity for Chest-to-Back (X Axis) and Side-to-Side (Y Axis) Exposures, AMRL TR 73-32, November 1973. (AD 773818)

Harris, C. S., H. C. Sommer, "Interactive Effects of Intense Noise and Low Level Vibration on Tracking Performance and Response Time," Aerospace Medicine, pp 1013-1016, Sep 73. Also AMRL-TR-73-14. (AD 770257).

Sommer, H. C., The Combined Effects of Vibration, Noise and Exposure Duration on Auditory Temporary Threshold Shift, AMRL-TR-73-34, Sep 73 (AD 770285).

Shoenberger, R. W., "An Investigation of Human Information Processing During Whole-Body Vibration." Aerospace Medicine, Vol 45, No. 2, 143-153, Feb 74. Also AMRL-TR-72-91 (AD 778052).

McCutcheon, E. P., R. G. Edwards, J. M. Evans, J. F. Lafferty, D. F. McCoy, A Standard Psychophysiological Preparation for Evaluating the Effects of Environmental Vibration Stress, Phase II: Implementation. AMRL-TR-73-118, Feb 74 (AD 781092).

Shoenberger, R. W., "Mechanisms of Vibration Effects on Aircrew Performance," Vibration and Combined Stresses in Advanced Systems, AGARD Conference Preprint No. 145, April 1974. Also AMRL-TR-73-133.

Sturges, D. V., D. W. Badger, R. N. Slarve, D. W. Wasserman, "Laboratory Studies on Chronic Effects of Vibration Exposure," Vibration and Combined Stresses in Advanced Systems, AGARD Conference Preprint No. 1455, April 1974. Also AMRL-TR-73-134.

von Gierke, H. E., "Vibration and Combined Stress in Advanced Systems," AGARD Conference Proceedings No. 145, Proceedings of the Aerospace Medical Panel Specialist's Meeting, Oslo, Norway, Apr 74. National Technical Information Service (NTIS), Springfield, VA.

Parker, D. E., H. E. von Gierke, "Sound, Vibration and Impact," Environmental Physiology (N. B. Slonim, editor) 119-162, The C. V. Mosby Company, St Louis, 1974.

Harrah, C. B., "Vibration Studies in Support of High Acceleration Cockpits," Presented at Air Force Office of Scientific Research (AFOSR) Meeting 8-10 Oct 74, Brooks AFB, Texas. Also AMRL-TR-74-109.

Sturges, D. V., "Laboratory Studies on Chronic Effects of Vibration Exposure," Presented at Air Force Office of Scientific Research (AFOSR) Meeting 8-10 Oct 74, Brooks AFB, Texas. Also AMRL-TR-74-111.

Levison, W. H., P. D. Houck, <u>Guide for the Design of Control Sticks in Vibration Environments</u>, <u>AMRL-TR-74-127</u>, Feb 75 (AD A008533).

von Gierke, H. E., "Standardizing the Dynamics of Man," The Shock and Vibration Bulletin, No. 45, Part 2 (1-16), The Shock and Vibration Center, Naval Research Laboratory, Washington DC, June 1975. Also AMRL-TR-74-129 (AD A014919).

von Gierke, H. E., C. W. Nixon, J. C. Guignard, "Noise and Vibration," Vol 2, Book 1, Part 2, Chapter 9, pp 355-405, Foundations of Space Biology and Medicine, Joint US/USSR Publication, 1975. NASA Special Publication No. 374. Also AMRL-TR-73-94.

Shoenberger, R. W., "Subjective Response to Very Low-Frequency Vibration." Aviation, Space and Environmental Medicine, 785-790, June 1975. Also AMRL-TR-74-142 (AD A013450).

Allen, R. W., R. E. Magdalena, H. R. Jex, Effects of Wideband Auditory Noise on Manual Control Performance and Dynamic Response, AMRL-TR-75-65, Oct 75 (AD A018667).

von Gierke, H. E., The ISO Standard, "Guide for the Evaluation of Human Exposure to Whole Body Vibration," SAE Truck Meeting, Paper No. 751009, Philadelphia, PA., 10-13 Nov 75. Also AMRL-TR-75-17.

Levison, W. H., Biomechanical Response and Manual Tracking Performance in Sinusoidal, Sum-of-Sines, and Random Vibration Environments, AMRL-TR-75-94, April 1976 (AD A026286).

Shoenberger, R. W., A Comparison of the Perceived Intensity of Sinusoidal and Multifrequency Whole-Body Vibration, AMRL-TR-76-1, June 1976 (AD A029203).

von Gierke, H. E., "Physiological and Psychological Factors in Aircraft Operations - An Overview," Proceedings of the Flight Mechanics Panel Symposium on Aircraft Operational Experience and its Impact on Safety and Survivability, Sandefjord, Norway, June 76. Also AMRL-TR-76-46.

Shoenberger, R. W., "Comparison of the Subjective Intensity of Sinusoidal, Multifrequency and Random Whole-Body Vibration," Aviation, Space and Environmental Medicine, Vol 47, No. 8, 856-862, August 1976. Also AMRL-TR-76-19 (AD A030259).

#### SECTION III

#### WINDBLAST

Lovelace, W. R. II, Baldes, E. J., and Wulff, V. J., THE EJECTION SEAT FOR EMERGENCY ESCAPE FROM HIGH-SPEED AIRCRAFT, TSEAL-3-696-74C, 31 August 1945.

Hull, W. E., TO REPORT A TRIP TO ROCHESTER, MINNESOTA, ON 19 JULY 1945, TSEAL3-696-88, 13 September 1945.

Nading, W. G., REPORT OF FLIGHT TESTS OF AUTO. PILOT EJECTION EQUIP-MENT CONDUCTED AT MUROC AAF, TSEAA-695-66, 25 July 1946.

Moore, W. L., and Hertzberg, H. T. E., MODIFIED FOOTBALL HELMET AS FLYER'S PROTECTIVE HELMET, TSEAA-666-14, 26 August 1947.

Moore, W. L., MODIFICATION OF TYPE P-1 PROTECTIVE HELMET AND STANDARD FLYING HELMETS FOR USE BY FIGHTER AND JET AIRCRAFT PILOTS, MCREXD-666-14B, 29 December 1948.

Staff - Aero Medical Laboratory, SYNOPSIS OF THE AERO MEDICAL ASPECTS OF JET PROPELLED AIRCRAFT, January 1949.

Santi, G. P., Hill, T. C., Mazza, V., and Carroll, C. E., PILOT EJECTION FLIGHT TESTS CONDUCTED WITH A TF80C AIRPLANE AT MUROC AND HAMILTON AIR FORCE BASES, MCREXA 7-45341-4-1, 15 August 1949.

Simmons, C. F., WINDBLAST PROTECTIVE VISOR ASSEMBLIES FOR USE WITH F-1 HELMETS AND A-13-A OXYGEN MASKS, AFTR 6037, September 1950.

Michels, E. M., WINDBLAST TEST OF THE MB-2 HELMET, WADC TN 55-287, November 1955.

Wiant, H. W., THE EFFECTS OF SIMULTANEOUS DECELERATION, TUMBLING, AND WINDBLAST ENCOUNTERED IN ESCAPE FROM SUPERSONIC AIRCRAFT, WADC TN 54-18, March 1956.

Lafferty, R. E., and Graetzer, R., A STRAIN GAUGE METHOD OF MEASURING WINDBLAST ON FLIGHT HEADGEAR, WADC TR 57-204, April 1957.

Engstrom, B. A., THE EFFECTS OF SIMULTANEOUS DECELERATION, TUMBLING AND WINDBLAST ENCOUNTERED IN ESCAPE FROM SUPERSONIC AIRCRAFT, WADC TN 54-18, Part 2, July 1957.

- Cotner, J. S., Analysis of Air Resistance Effects on the Velocity of Falling Human Beings, AMRL-TR-69-39, May 69 (AF 761490).
- Payne, P. R., Notes on the Initiation of Limb Flailing, AMRL-TR-71-45, Aug 71, (AD 731195).
- Payne, P. R. and F. W. Hawker, <u>USAF</u> Experience of Flail Injury for Noncombat Ejections in the <u>Period 1964-1970</u>. <u>AMRL-TR-72-111</u>, May 74, (AD 921780L)(Distributed Limited to US Government Only).
- Payne, P. R., Some Studies Relating to 'Limb Flailing' After an Emergency Escape from an Aircraft. AMRL-TR-73-24, Dec 74 (AD A005699).
- Payne, P. R., On the Avoidance of Limb Flail Injury by Ejection Seat Stabilization, AMRL-TR-74-9, May 74 (AD 783913).
- Brinkley, J. W., "Windtunnel Tests of a USAF Flight Helmet and Loss Preventor," Proceedings of the ASCC WG61 Meeting, Auckland, NZ, Oct 74. Also AMRL-TR-75-75 (AD A015734).
- Payne, P. R., Low Speed Aerodynamic Forces and Moments Acting on the Human Body, AMRL-TR-75-6, Jul 75 (AD A015801).
- Payne, P. R., F. W. Hawker, A. J. Euler, Stability and Limb Dislodgement with the F-105 and ACES II Ejection Seats, AMRL-TR-75-8, Jul 75 (AD A015726).
- Payne, P. R., Selected Topics on Tractor Escape Systems, AMRL-TR-75-9, Jul 75 (AD A018073).
- Hawker, F. W., A. J. Euler, Extended Aero-Stability in Limb Dislodgement Measurements with the ACES II Ejection Seats, AMRL-TR-75-15, Jul 75 (AD A014432).
- Payne, P. R., The Heat Pulse Associated with Escape from an Aircraft at Supersonic Speed, AMRL-TR-76-2, June 76 (AD A028988).
- Hawker, F. W., A. J. Euler, Windtunnel Measurements of Vertical Acting Limb Flail Forces and Torso/Seat Back Forces in an ACES II Ejection Seat, AMRL-TR-76-3, June 76 (AD A029180).

#### SECTION IV

### ESCAPE

Penrod, K.E., OXYGEN REQUIREMENTS IN PARACHUTE DESCENT FROM 30,000 FEET, EXP-M-49-696-6, 24 July 1942.

Penrod, K. E., BAILING OUT ABOVE 30,000 FEET, EXP-M-49-696-6A, 27 November 1942.

Holmes, F. E., OXYGEN REQUIREMENT FOR PARACHUTE DESCENTS, ENG-M-49-696-6B, 20 February 1943.

Holmes, F. E., TESTS OF THE H-1 OXYGEN CYLINDER, ENG-M-49-696-6C, 27 February 1943.

Speert, H., BAIL-OUT EMERGENCY EQUIPMENT, ENG-M-49-696-37, 17 April 1943.

Lovelace, W. R., II and Allen, S. C., PARACHUTE DESCENT FROM A PRESSURE ALTITUDE OF 39,750 FEET (DENSITY ALTITUDE, 40,200 FEET), ENG-49-695-1K, 9 July 1943.

Penrod, K. E., FLOW REQUIREMENTS FOR THE H-2 EMERGENCY OXYGEN BOTTLE, ENG-49-696-7A, 17 July 1943.

Castellano, C. S., TYPE H-2 BAIL-OUT CYLINDER ASSEMBLY, ENG-49-660-14-L-8, 28 November 1943.

Jennings, J. W., TYPE H-2 EMERGENCY OXYGEN CYLINDER ASSEMBLY, ENG-49-660-14-R-8, 29 November 1943.

Bonner, J. T., BREATHING PATTERN IN A PARACHUTE HARNESS, ENG-49-696-7G, 19 February 1944.

Penrod, K. E., PHYSIOLOGICAL TESTS OF THE H-2 EMERGENCY OXYGEN CYLINDER, ENG-49-696-71, 25 February 1944.

Penrod, K. E., OXYGEN FLOW REQUIREMENTS FOR BAILING OUT AT 42,000 FEET, ENG-49-696-7J, 24 March 1944.

Hallenbeck, G. A., MacCardle, R. C., and Penrod, K.E., THE MAGNITUDE AND DURATION OF PARACHUTE OPENING SHOCKS AT VARIOUS ALTITUDES AND AIR SPEEDS, ENG-49-696-66, 8 July 1944.

Olson, R. L., STUDIES OF ESCAPE HATCHES, ENG-49-695-32BB, 11 September 1944.

Hallenbeck, G. A. and Martin, E. E., AN ANEROID ACTIVATED PARACHUTE OPENING DEVICE, TSELA5B-696-66A, 25 October 1944.

Hall, F. G. and Swann, H. G., PHYSIOLOGICAL EFFECTS OF HIGH NEGATIVE MASK PRESSURE DURING A SIMULATED FREE-FALL, TSEAL3-696-68, 8 November 1944.

PARACHUTE COMMENTS FROM THE EUROPEAN THEATER OF OPERATIONS, JULY-SEPTEMBER, TSEAL-3-695-32EE, 17 November 1944.

Martin, E.E., Maison, G. L., and Peck, R. M., EXERTION REQUIRED OF PERSONNEL IN OPENING A-3 CHEST-TYPE PARACHUTE, TSEAL3-696-69, 22 December 1944.

Maison, G. L., PROPOSAL FOR HIGH ALTITUDE BAIL-OUT PROGRAM, TSEAL3-696-66B, 21 February 1945.

Hallenbeck, G. A., Penrod, K. E., and MacCardle, R., 'Magnitude and Duration of Opening Parachute Shock, Air Surgeons' Bulletin 2: 35-37, February 1945.

Swann, H. G., PHYSIOLOGICAL EFFECTS OF HIGH NEGATIVE MASK PRESSURES DURING A SIMULATED FREE-FALL, REPORT NO. 2, TSEAL3-696-68A, 8 March 1945.

Martin, E. E., DEVELOPMENT OF AUTOMATIC PARACHUTE OPENING DEVICE, TSEAL3-696-66D, 15 March 1945.

Glazier, J. C., TECHNIQUE OF HIGH ALTITUDE PARACHUTE RELEASE, TSEAL-3-696-66E, 31 March 1945.

Martin, E. E., EXERTION REQUIRED OF PERSONNEL IN OPENING TYPE B-8 BACK PACK PARACHUTE, TSEAL3-696-69C, 2 May 1945.

Penrod, K. E., Maison, G. L., and Hall, F. G., COMPARISON OF SHOCK FORCE AT OPENING OF SILK AND NYLON PARACHUTES AT VARIOUS ALTITUDES, TSEAL3-696-66C, 5 May 1945.

REPORT OF CONFERENCE ON EJECTION OF PERSONNEL FROM DAMAGED AIR-CRAFT, TSEAL-3-696-74, 8 May 1945.

Maison, G. L., SELECTION OF AREA FOR THIRD AIR TECHNICAL SERVICE COMMAND HIGH ALTITUDE PARACHUTE DROPPING PROGRAM, TSEAL-3-696-66F, 16 May 1945.

Penrod, K. E., Maison, G. L., and Hall, F. G., COMPARISON OF SHOCK FORCE OF OPENING OF 24 AND 28-FOOT NYLON PARACHUTES AT VARIOUS ALTITUDES, TSEAL3-696-66G, 22 May 1945.

Maison, G. L., Penrod, K. E., and Hall, F. G., DESCENT TIMES OF 200-POUND DUMMIES WITH 28-FOOT NYLON AND 24-FOOT NYLON PARACHUTES, TSEAL3-696-66H, 30 May 1945.

Hickham, J. B., TEST OF EXPERIMENTAL BAILOUT HELMET, TSEAL-3-697-7F, 22 June 1945.

Collias, N. E., PARACHUTES AND PARACHUTE TRAINING IN HEAVY BOMBARD-MENT CREWS, TSEAL-3-697-29, 30 June 1945.

Maison, G. L., and Penrod, K. E., COMPARISON OF SHOCK FORCE AT OPENING OF RIPSTOP NYLON AND STANDARD NYLON PARACHUTES, TSEAL3-696-661, 20 July 1945.

Lovelace, W. R., II, Baldes, E. J., and Wuff, V. J., THE EJECTION SEAT FOR EMERGENCY ESCAPE FROM HIGH-SPEED AIRCRAFT, TSEAL-3-696-74C, 31 August 1945.

Maison, G. L., AUTOMATIC PARACHUTE OPENING DEVICE, II, TSEAL3-696-82, 8 September 1945.

Hull, W. E., TO REPORT A TRIP TO ROCHESTER, MINNESOTA, ON 19 JULY 1945, TSEAL3-696-88, 13 September 1945.

Martin, E. E., EXERTION REQUIRED OF PERSONNEL IN OPENING THE S-1 SEAT PACK PARACHUTE, TSEAL3-696-69D, 18 September 1945.

Chatham, J. D., CONNECTOR, COMBINATION (MASK HOSE AND BAILOUT), TSEAL-3-660-88-A, 20 September 1945.

Maison, G. L., Penrod, K. E., and Hall, F. G., "Parachute Shock Forces," Air Surgeons' Bulletin 2:10 pp 350-3, September 1945.

REPORT ON TRIP TO WASHINGTON, D.C., AND ORLANDO, FLORIDA TO GATHER INFORMATION ON DITCHING PROBLEMS, TSEAL-3-696-92A, 12 October 1945.

REPORT ON TRIP TO WASHINGTON, D. C., AND ORLANDO, FLORIDA TO GATHER INFORMATION ON DITCHING PROBLEMS, TSEAL-3-696-92B, 12 October 1945.

Chatham, J. D., GERMAN BAILOUT SYSTEM, TSEAL-3-660-88-B, 24 October 1945.

Chatham, J. D., CONNECTOR, COMBINATION (MASK HOSE AND BAILOUT) AS A PRESSURE BREATHING DEVICE, TSEAA-3-660-88, 20 November 1945.

Nading, W. G., REPORT OF FLIGHT TESTS OF AUTO. PILOT EJECTION EQUIP-MENT CONDUCTED AT MUROC AAF, TSEAA-695-66, 25 July 1946.

Guillemin, V., Jr., EJECTION SEAT FORCE METER, TSEAA-695-66A, 18 October 1946.

Hull, W. E., EJECTION SEAT DISPLACEMENT TIMER, TSEAA-695-66B, 18 October 1946.

Savely, H. E., LABORATORY TESTS OF CATAPULT EJECTION SEAT USING HUMAN SUBJECTS, TSEAA-695-66C, 30 October 1946.

KINETIC MEASUREMENTS ON A PILOT-DUMMY EJECTED FROM A P-61 AIRPLANE IN FLIGHT, DETAILED ANALYSIS OF DATA, TSEA12A/4303-45-1, October 1946.

Hertzberg, H. T. E., ANGULAR FIELDS OF VIEW THROUGH THE A-1 GUNSIGHT IN THE P-80 COCKPIT MODIFIED FOR EJECTION, TSEAA-695-73, 11 December 1946.

Shaw, R. S., ACCELERATION-TIME DIAGRAMS FOR CATAPULT EJECTION SEATS, TSEAA-695-66D, 11 February 1947.

Hallenbeck, G. A., RATES AND TIME OF FREE FALL OF ANTHROPOMORPHIC DUMMIES AND OF MAN, TSEAA-696-100, 1 March 1946.

Shaw, R. S., HUMAN TOLERANCE TO NEGATIVE G OF SHORT DURATION, TSEAA-695-74, 19 May 1947.

Moore, W. L. and Hertzberg, H. T. E., MODIFIED FOOTBALL HELMET AS FLYER'S PROTECTIVE HELMET, TSEAA-666-14, 26 August 1947.

Sweeney, H. M., Savely, H. E., and Ames, W. H., TESTS ON EJECTION SEAT CATAPULT, TSEAA-695-66H, 29 August 1947.

Mazza, V. and Savely, H. E., PNEUMATIC CATAPULTS FOR SIMULATED EJECTION TESTS, TSEAA-695-66F, 8 September 1947.

Shaw, R. S., HUMAN TOLERANCE TO ACCELERATION IN DOWNWARD SEAT EJECTION, TSEAA-695-74C, 12 December 1947.

Ames, W. H., Sweeney, H. M., and Savely, H. E., "Human Tolerance to Acceleration in Pilot Ejection," J. Aviation Med. 18:548-553, 1947.

Savely, H. E. and Ames, W. H., ARM RESTS ON EJECTION SEATS, TSEAA 695-66 G, January 1948.

Ames, W. H. and Savely, H. E., MOTION OF THE HEAD DURING SIMULATED SEAT EJECTION, MCREXD 695-66 I, January 1948.

Lenz, R. C., KINETIC MEASUREMENTS ON A PILOT DUMMY EJECTED FROM A P-82 AIRCRAFT, MCREXA-8-45341-3-4, March 1948.

Hill, T. C., Jr. and Shaw, R. S., PROPOSED TUMBLING STUDIES, MCREXD-695-66 J, 18 March 1948.

Shaw, R. S., TEST FIRING OF T-7 CATAPULT FOR DOWNWARD SEAT EJECTION, MCREXD-695-74 I, 11 May 1948.

Hill, T. C. and Savely, H. E. TESTS OF T-8 INDOCTRINATION CATAPULT, MCREXD-695-66 K, 2 November 1948.

EFFICACY OF STANDARD BAILOUT EQUIPMENT IN EFFECTING EMERGENCY DESCENTS FROM AN ALTITUDE OF 50,000 FEET, MCREXD-696-107 F, 8 November 1948.

Moore, W. L., MODIFICATION OF TYPE P-1 PROTECTIVE HELMET AND STANDARD FLYING HELMETS FOR USE BY FIGHTER AND JET AIRCRAFT PILOTS, MCREXD-666-14B, 29 December 1948.

Strand, O. T., PROTECTIVE HELMET IMPACT TESTING EQUIPMENT, AFTR 5820, 1949.

(Staff - Aero Medical Laboratory) SYNOPSIS OF THE AERO MEDICAL ASPECTS OF JET PROPELLED AIRCRAFT, January 1949.

Fonch, H. W. and Sierer, T. E., TESTS OF NAMC TYPE CATAPULT PERSONNEL EJECTION ON THE AERO MEDICAL LAB 100 FT. VERTICAL TRACK, MCREXA-45341-3-10, January 1949.

Karstens, A. I., FLIGHT TESTS OF THE EMERGENCY PARTIAL PRESSURE SUIT. II (BAILOUT BOTTLE AND REGULATOR ASSEMBLY), MCREXD-696-104N, 7 February 1949.

Denzin, E. C., A DECELERATOR FOR HUMAN EXPERIMENTATION, AFTR 5973, April 1949.

Stapp, J. P., HUMAN EXPOSURES TO LINEAR DECELERATION. PART I. PRE-LIMINARY SURVEY OF AFT-FACING SEATED POSITION, AFTR 5915, Part I, June 1949.

Santi, G. P., Hill, T. C., Mazza, V., and Carroll, C. E., PILOT EJECTION FLIGHT TESTS CONDUCTED WITH A TF80C AIRPLANE AT MUROC AND HAMILTON AIR FORCE BASES, MCREXA7-45341-4-1, 15 August 1949.

Hertzberg, H. T. E., Daniels, G. S., THE CENTER OF GRAVITY OF A FULLY LOADED F-86 EJECTION SEAT IN THE EJECTION POSITION, MCREXD-45341-4-5, 14 March 1950.

Mazza, V., Briggs, R. W., Carroll, C. E., and Wheeler, R. V., HIGH ALTITUDE BAILOUTS, MCREXD 695-66 M, September 1950.

Sweeney, H. M. and Mazza V., CURRENT PERSONAL EQUIPMENT AND ESCAPE PROBLEMS IN THE FEAF, MCREXD-695-66N, 10 March 1951.

Stapp, J. P., HUMAN EXPOSURES TO LINEAR DECELERATION. PART II, THE FORWARD-FACING POSITION AND THE DEVELOPMENT OF A CRASH HARNESS, AFTR 5915, Part II, December 1951.

Rothwell, W. S. and Sperry, E. G., FOOTRESTS ON UPWARD EJECTION SEATS, WADC TR 52-208, September 1952.

White, C., Johnson, P., and Hertzberg, H. T. E., REVIEW OF ESCAPE HATCH SIZES FOR BAILOUT AND DITCHING, WCRD TN 52-81, November 1952.

Henry, J. P., "Problems of Escape During Flights Above 50,000 Feet," In White, S., & O. O. Benson, eds., <u>Physics and Medicine of the Upper Atmosphere</u>. (Albuquerque, N. Mex.: University of N. Mex. Press, 1952) p. 516.

Savely, H. E., "Human Problems in Escape from High Speed Aircraft," <u>Air University Quarterly Review</u>, Vol. V. No. 2, 65-67, 1952.

Edelberg, R. E., Weiss, H. S., and Charland, P. V., PHYSIOLOGY OF SIMPLE TUMBLING, PHASE I - ANIMAL STUDIES, WADC TR 53-139, May 1953.

Edelberg, R. E., and Weiss, H. S., PHYSIOLOGY OF SIMPLE TUMBLING, PHASE II - HUMAN STUDIES, WADC TR 53-139, June 1953.

Hecht, K., Beaupre, F. J., and Sperry, E. G., DOWNWARD CREW EJECTION SEAT TESTS FROM THE B-47B AIRPLANE, WADC TR 53-443, November 1953.

Edelberg, R., and Weiss, H., "Hydrostatic Behavior of the Vascular Column During Tumbling," Fed. Proc., 12:37, 1953.

Morrison, N. K., and Schafer, L. A., GROUND STUDY OF THE NONEJECTION METHODS OF ESCAPE FROM B-47B AIRCRAFT, WADC TR 54-6, February 1954.

Wiant, H. W., THE EFFECTS OF SIMULTANEOUS DECELERATION, TUMBLING, AND WINDBLAST ENCOUNTERED IN ESCAPE FROM SUPERSONIC AIRCRAFT, WADC TN 54-18, March 1956.

Henderson, A. M., "Downward Ejection," <u>Combat Crew</u> 5(4):27-29, October 1954.

Weiss, H., Edelberg, R., Charland, P., and Rosenbaum, J., "Animal and Human Reactions to Rapid Tumbling," J. Aviation Med., 25:5, 1954.

Hecht, K., and Sperry, E., DOWNWARD EJECTION FLIGHT TESTS OF A SHOCK ABSORBING FIRING SYSTEM, WADC TN 55-239, September 1956.

Sperry, E. G., Nielsen, H. P., and Barash, I. M., "Downward Ejections at High Speeds and High Altitudes," J. Aviation Med. 26:356-372, 1955.

Edelberg, R., "Hydrostatic Effects of Combined Tumbling and Deceleration," Supplement to Shock and Vibration Symposium, 22:20, 1955.

Edelberg, R., Henry, J. P., Maciolek, J. A., Salzman, E. W., and Zuidema, G. D., "Comparison of Human Tolerance to Accelerations of Slow and Rapid Onset," J. Aviation Med. 27:482, 1956.

Michel, E. M., SURVIVAL SPACE REQUIREMENT FOR INDIVIDUAL AIRCRAFT ESCAPE CAPSULES, WADC TN 56-526, February 1957.

Engstrom, B. A., THE EFFECTS OF SIMULTANEOUS DECELERATION, TUMBLING AND WINDBLAST ENCOUNTERED IN ESCAPE FROM SUPERSONIC AIRCRAFT, WADC TN 54-18, Part 2, July 1957.

McGuire, T. F. and Leary, F. J., BIBLIOGRAPHY AND OPERATIONAL COMPARISON OF CURRENT PARTIAL PRESSURE SUITS, PART 2, TIME - ALTITUDE CAPABILITIES AND BENDS INCIDENCE OF MC-1 (AND X-90) AND MC-3 (MC-4) PARTIAL PRESSURE SUIT ENSEMBLES WITH A DISCUSSION OF "GET ME DOWN" TYPE SUITS, WADC TR 57-536, Part 2, August 1957.

Madson, R. A., HIGH ALTITUDE BALLOON DUMMY DROPS, PART 1, THE UN-STABILIZED DUMMY DROPS, WADC TR 57-477, Part 1, October 1957.

Geer, R. L., OPERATIONAL REGIONS AND BIO-AERODYNAMIC LIMITATIONS OF FUTURE AIRCRAFT ESCAPE SYSTEMS, WADC TR 57-590, October 1957.

Bondurant, S., OPTIMAL ELASTIC CHARACTERISTICS OF EJECTION SEAT CUSHION FOR SAFETY AND COMFORT, WADC TN 58-260, September 1958.

Miller, A. E. and Replogle, E. H., DEVELOPMENT OF AN EMERGENCY PRESSUR-IZATION SYSTEM FOR AN ESCAPE CAPSULE, WADC TR 58-397, May 1959.

Kearney, A. P., Mills, B. J., and Huey, R. S., EMERGENCY ESCAPE CAPSULE STUDIES. PHASE I: PRELIMINARY LABORATORY FLOTATION STUDIES. WADC TR 59-247, Part I, June 1959.

- von Gierke, H. E., "Laboratory Research on Dynamic Acceleration Stress," Proceedings of AMD/ASD Conference on Crew Escape Techniques for Aerospace Vehicles, February 1963.
- Brinkley, J. W., E. B. Weis, Jr., "Optimization of Acceleration Protection in Escape Systems," <u>Proceedings of AMD/ASD Conference on Crew Escape</u> Techniques for Aerospace Vehicles, February 1963.
- Clarke, N. P., "Biochemical Criteria for Escape: Field Evaluation," Proceedings of AMD/ASD Conference on Crew Escape Techniques for Aerospace Vehicles, February 1963.
- Clarke, N. P., "Biodynamic Response to Supersonic Ejection," Aerospace Medicine, Vol. 34, No. 12, December 1963.
- Henzel, J. H., G. C. Mohr, H. E. von Gierke, "Reappraisal of Biodynamic Implications of Human Ejections," <u>Aerospace Medicine</u>, Vol. 39, No. 3, 231-240, March 1968. Also cataloged as AMRL Technical Report 66-43, (AD 708776).
- Brinkley, J. W., "Development of Aerospace Escape Systems," <u>Air University</u> <u>Review</u>, July August 1968.
- Brinkley, J. W., E. R. Dearing, L.T. Rauterkus, Evaluation of the Effects of Selected Egress System. Design Parameters During  $+G_7$  Acceleration. AMRL Technical Report 69-51, May 1969, (AD 770972).
- Mohr, G. C., J. W. Brinkley, L. E. Kazarian, W. W. Millard, "Variations of Spinal Alignment in Egress Systems and Their Effect," <u>Aerospace Medicine</u>, Vol. 40, No. 9, 983-988, September 1969. Also cataloged as AMRL Technical Report 67-232.
- Payne, P. R., "Injury Potential of Ejection Seat Cushions," <u>Journal of Aircraft</u>, Vol. 6, No. 3, 273-278, Copyright 1969, American Institute of Aeronautics and Astronautics. Also cataloged as AMRL Technical Report 69-134, (AD 697886).
- Brinkley, J. W. and J. T. Shaffer, "Dynamic Simulation Techniques for the Design of Escape Systems: Current Applications and Future Air Force Requirements," Symposium of Biodynamic Models and Their Applications, 71-104, October 1970, AMRL 71-29, (AD 739501).
- Brinkley, J. W., and J. T. Shaffer, "Restraint Design: Laboratory Test and Evaluation of Operational Effectiveness," AGARD Conference Report No. 88, Advisory Group for Aerospace Research and Development, NATO, June 1971.

- Band, E. G. U., <u>Calculation of Rocket Powered Trajectories of a "Plane of Symmetry" Model of a Human Subject and Ejection Seat</u>, <u>AMRL Technical Report 71-7</u>, <u>August 1971</u>, (AD 730907).
- Payne, P. R., D. A. Shaffer, An Optimum Acceleration-Time History for an Escape System, AMRL Technical Report 70-143, August 1971, (AD 731194).
- Band, E. G. U., The Dynamics of An Ejection Seat Catapult With a 'Live Load', AMRL TR 71-18, August 1971, (AD 730635).
- Payne, P. R., and E. G. U. Band, <u>Development of a Dynamic Analog Anthropomorphic Dummy for Aircraft Escape System Testing</u>, <u>AMRL TR 71-10</u>, <u>August 1971</u>, (AD 730634).
- Shaffer, J. T., "Dynamic Principles for Seat Cushion Evaluation." <u>Proceedings</u> of the Ninth Annual Symposium Survival and Flight Equipment Association, Western Periodical Company, North Hollywood, California, September 1971. Also AMRL TR 71-129
- Brinkley, J. W., Application of a Biodynamic Model to Predict Spinal Injuries from Use of Aircraft Ejection Seats, 1971 AFSC Science and Engineering Symposium, October 1971.
- Peterson, R. L. and E. O. Roberts, "Experimental Investigation of the Ground Impact Characteristics of a Full Scale Aircraft Emergency Escape Capsule System." Technical Report AFFDL-TR-72-34, Air Force Flight Dynamics Laboratory, July 1972.
- Buschman, D. L. and S. E. Rittgers, "Injuries Induced by High Speed Ejection: An Analysis of USAF Noncombat Operational Experience." <u>Proceedings of the Tenth Annual Symposium Survival and Flight Equipment Association</u>, Western Periodical Co., North Hollywood, Calif., 1972. Also AMRL TR 72-78.
- Brinkley, J. W. and P. R. Payne, "An Assessment of Aerodynamic Forces Acting on the Crewman During Escape." Presented at the AGARD Aerospace Medical Panel Specialists Meeting, Soesterberg, Netherlands, 3-7 September 1973. Also AMRL TR 73-63.
- Brinkley, J. W., J. Ward, P. R. Payne, "A Study of Aerodynamic Forces As A Cause of Injury During Emergency Escape." Presented at the Aerospace Medical Association Meeting, 1973. Also AMRL TR 73-55. (AD 770990).
- Noyes, F. R., H. E. von Gierke, J. L. DeLucas, "Bone and Ligament Strength: A Biomechanical Analysis of Emergency Escape Injuries Simulated in Primates." Presented at the Aerospace Medical Association Meeting, 1973.

Brinkley, J. W., J. T. Shaffer, "Restraint Design: Laboratory Test and Evaluation of Operational Effectiveness," Presented at AGARD Aerospace Medical Panel Meeting, Porto, Portugal, June 71. Also AMRL-TR-71-40.

Payne, P. R., E. G. v. Band, "A New Look at Parachute Opening Dynamics," The Aeronautical Journal of the Royal Aeronautical Society, London, pp 85-93, Feb 73. Also AMRL-TR-71-5 (AD A001447).

Shaffer, J. T., J. W. Brinkley, "Lateral (-G<sub>X</sub>) Impact Tests with Inflatable Restraint Systems for Air Force Escape Module Application," Society of Automotive Engineers, Report No. 740043, Feb 74. Also AMRL-TR-73-116.

Brinkley, J. W., "Review of the Operational Efficacy of USAF Flight Helmets in Crash and Escape Environments," Proceedings of ASCC WG61 Meeting, Auckland, NZ, Oct 74. Also AMRL-TR-75-74 (AD A014263).

Payne, P. R., Low Speed Aerodynamic Forces and Moments Acting on the Human Body, AMRL-TR-75-6, Jul 75 (AD A015801).

Payne, P. R., Selected Topics on Tractor Escape Systems, AMRL-TR-75-9, Jul 75 (AD A018073).

Madson, R. A., "A Study of Parachute Landing Injuries and the Relationship to Parachute Performance and Landing Conditions," Presented at the SAFE Meeting, 21-26 Sep 75, San Antonio, TX.

Payne, P. R., The Heat Pulse Associated with Escape from an Aircraft at Supersonic Speed, AMRL-TR-76-2, June 76 (AD A028988).

Belytschko, T., L. S. Schwer, A. B. Schultz, A Model for Analytic Investigation of Three-Dimensional Spine-Head Dynamics, AMRL-TR-76-10, Apr 76 (AD A025931).

# APPENDIX A IMPACT PUBLICATIONS

#### Aeromedical Research Laboratory, Holloman AFB, New Mexico

Stapp, J. P., "Tolerance to Abrupt Deceleration," Shock and Vibration Bulletin No. 19, February 1953.

Rothman, M. I., MEMORANDUM REPORT ON SLERAN, March 1953.

Stapp, J. P., "Crash Protection in Air Transports," <u>Aeronautical Engineering</u> Rev., 12(4):71-78, 1953.

Stapp, J. P., "Tolerance to Abrupt Deceleration," AGARD Medical Panel, London, 1953.

Rothman, M. I., TECHNICAL NOTES ON SLERAN, HADC TN 54-2, February 1954.

Stapp, J. P., "Effects of Mechanical Force on Living Tissues, I" J. Aviation Med., 26:277, August 1954.

PROJECT 91-MX981 AERO MED SLED RUN DATA - HOLLOMAN TRACK, 14 September 1954.

"Rocket Sleds as Biological Test Vehicles," Paper presented before the American Rocket Society, 1954.

Stapp, J. P., TRACK TESTING THE BRAIN OF THE WEAPON SYSTEMS, 1954.

Stapp, J. P., "Effects of Mechanical Force on Living Tissues I. Abrupt Deceleration and Windblast," <u>Journal of Aviation Medicine</u> 26(4):268-288, August 1955.

Stapp, J. P., "Tolerance to Abrupt Deceleration," In <u>Collected Papers on Aviation Medicine</u>, AGARDograph No. 6, 1955.

Stapp, J. P., "Measurement for Survival," Ordnance 40(16):975-979, May-June 1956.

CRITERIA FOR CRASH PROTECTION IN ARMED FORCES GROUND VEHICLES, HADC TN, April 1956.

Stapp, J. P., BIODYNAMICS OF HUMAN FACTORS IN AVIATION, MISSILE TEST DATA AND INSTRUMENTAL REQUIREMENTS, Project 7850, 15 October 1956.

Stapp, J. P., and Hughes, C. D., "Effects of Mechanical Force on Living Tissue II - Supersonic Deceleration and Windblast," <u>J. Aviation Med.</u> 27:407-413, 1956.

Beeding, E. L., Jr., TEST REPORT ON AMFL SHORT TRACK FACILITY, Proj. No. 7850, 28 January 1957.

Beeding, E. L., Jr., DAISY TRACK AND SUPPORTING SYSTEMS, HADC IN 57-8, June 1957.

Lewis, S. T., and Stapp, J. P., A CRASH-RESTRAINT DEMONSTRATION, HADC TN 57-9, June 1957.

Stapp, J. P., "Automobile Seat Belts," Hearings before a Subcommittee of the Committee on Interstate and Foreign Commerce, House of Representatives, Eighty-fifth Congress, First Session, August 1957.

Beeding, E. L., Jr., DAISY TRACK TESTS, 18 APRIL - 11 JUNE 1957, Test Report No. 6, 10 September 1957.

Wilson, C. E., Jr., THE HOLLOMAN TRACK, AFMDC TR 57-1, September 1957.

Lewis, S. T., and Stapp, J. P., EXPERIMENTS CONDUCTED ON A SWING DE-VICE FOR DETERMINING HUMAN TOLERANCE TO LAP BELT TYPE DECELERATIONS, AFMDC TN 57-1, December 1957.

Stapp, J. P., "Human Tolerance to Deceleration," Amer. J. Surgery 93:734-740, 1957.

Lyle, D. J., Stapp, J. P., and Button, R. R., "Ophthalmology Hydrostatic Pressure Syndrome," Amer. J. of Ophthalmology 44, No. 5, Part I, 1957.

Stapp, J. P., and Blount, W. D., "Effects of Mechanical Force on Living Tissues III - A Compressed Air Catapult for High Impact Forces," J. Aviation Med. 28:77-82, 1957.

Stapp, J. P., and Lewis, S. T., "Human Factors of Crash Protection in Automobiles," <u>Trans. Soc. Automat. Engrs.</u> 65:488-92 (also "Discussion" <u>SAE J.</u> 65(4):29), 1957.

Stapp, J. P., Lewis, S. T., and Ryan, J. J., PRELIMINARY INVESTIGATIONS OF HYDRAULIC BUMPER AND ROLL-OVER STRUCTURE, AFMDC TN 58-5, February 1958.

Beeding, E. L., Jr., DAISY TRACK TESTS, 13 JUNE 1957 - 17 DECEMBER 1957, Test Report No. 7, 7 March 1958.

Stapp, J. P., "Human Tolerance to Aircraft Seat Belt Restraint," <u>J. Aviation Med.</u>, 29(3):187-196, March 1958.

Beeding, E. L., Jr., DAISY TRACK TESTS - TEST NUMBERS: 338-519 22 MAY 1958 - 9 JULY 1959, Project 7850, December 1959.

Beeding, E. L., Jr., and Hessburg, R. R., Jr., DAISY TRACK TESTS 271-337; RUN: 4 FEBRUARY - 19 MAY 1958, Project No. 7850, Test Report No. 8, November 1958.

Stapp, J. P., and Enfield, D. L., "Evaluation of the Lap-Type Automobile Safety Belt with Reference to Human Tolerance," SAE Preprint 62A, 1958.

Stapp, J. P., "Crash Injury Prevention, Part 1," <u>Cincinnati J. Med.</u> 39(1): 1-5, 1958.

Stapp, J. P., and Enfield, D. L., "Lap Belts Need Sound Design," <u>SAE Journal</u> 66(9):30-31, Part 2, 1958.

RESEARCH ACCOMPLISHMENTS IN BIODYNAMICS: DECELERATION AND IMPACT AT THE AIR FORCE MISSILE DEVELOPMENT CENTER (AERO MEDICAL FIELD LAB), 1958.

Beeding, E. L., Jr., Stapp, J. P., and Hessburg, R. R., Jr., DAISY TRACK TEST (COMPLETE SERIES OF REPORTS), April 1957 - December 1959.

# APPENDIX B IMPACT PUBLICATIONS

USAF School of Aerospace Medicine, Brooks AFB, Texas

- Hass, G. M., RELATIONS BETWEEN TIME OF DAY, OCCURRENCE AND AIR-CRAFT ACCIDENTS, AND INJURIES TO OCCUPANTS OF AIRCRAFT AT RANDOLPH FIELD, TEXAS, IN 1942, Rpt. No. 120-1, February 1943.
- Hass, G. M., THE RELATIONS BETWEEN TIME OF DAY, NATURE AND AIRCRAFT ACCIDENTS, TYPES OF AIRCRAFT AND DEGREES OF INJURY TO FLYING PERSONNEL AT RANDOLPH FIELD, TEXAS IN 1942, Rpt. No. 123-1, 1943.
- Hass, G. M., THE RELATIONS BETWEEN INJURIES DUE TO AIRCRAFT ACCIDENTS AT BROOKS FIELD, TEXAS, IN 1942 AND THE CAUSES AND NATURE OF THE ACCIDENTS, Report No. 144-1, 1943.
- Hass, G. M., RELATIONS BETWEEN INJURIES TO OCCUPANTS OF AIRCRAFT AND THE TIME OF DAY AT WHICH AIRCRAFT ACCIDENTS OF VARIOUS TYPES AND CAUSES OCCURRED AT BROOKS FIELD, TEXAS IN 1942, Report No. 146-1, 1943.
- Hass, G. M., AN ANALYSIS OF RELATIONS BETWEEN FORCE, AIRCRAFT STRUCTURE, AND INJURIES TO PERSONNEL INVOLVED IN AIRCRAFT ACCIDENTS WITH RECOMMENDATIONS FOR SAFER PRINCIPLES IN DESIGN OF CERTAIN TYPES OF AIRCRAFT, Report No. 187-1, November 1943.
- Hass, G. M., A STUDY OF CLINICAL AND PATHOLOGICAL ASPECTS OF INTESTINAL AND MESENTERIC LESIONS RESULTING FROM AIRCRAFT ACCIDENTS, Rpt. No. 237-1, March 1944.
- Rushmer, R. F., INTERMAL INJURY PRODUCED BY ABRUPT DECELERATION OF SMALL ANIMALS, Proj. No. 241, Rpt. No. 1, September 1944.
- Rushmer, R. F., COMPARISON OF EXPERIMENTAL INJURIES FROM DECELERATIVE FORCES APPLIED TO THE VENTRAL AND DORSAL ASPECTS OF RABBITS DURING SIMULATED AIRCRAFT ACCIDENTS, Project No. 301, Report No. 1, October 1944.
- Hass, G. M., "Internal Injuries of Personnel Involved in Aircraft Accidents," Air Surgeon's Bulletin 1:5-10, 1944.
- Hass, G. M., "Relations between Force, Major Injuries and Aircraft Structure, with Suggestions for Safety in Design of Aircraft," <u>J. Aviation Med.</u>, 15:395-400, 1944.
- Rushmer, R. F., "Deceleration," Paper presented at conference on "Recent Developments in Aviation Medicine," 4-5 June 1945.

Rushmer, R. F., Green, E. L., and Kingsley, H. D., "Internal Injuries Produced by Abrupt Deceleration of Experimental Animals," <u>J. Aviation Med</u>. 17: 511-525, also Rpt. No. 401-1, January 1946.

Rushmer, R. F., "Crash Injuries in Experimental Animals," <u>Federation Proceedings</u> 5:90, February 1946.

Rushmer, R. F., and Hass, G. M., A COMPARISON OF CRASH INJURIES IN MAN AND IN LABORATORY ANIMALS, Proj. No. 471, Report No. 1, 25 March 1946.

Rushmer, R. F., THE CHANGES IN PRESSURE IN THE PERITONEAL CAVITY PRODUCED BY SUDDEN DECELERATION OF EXPERIMENTAL ANIMALS, Report No. 472-1, April 1946.

Hass, G. M., "The Effects of Aircraft Accidents upon the Future Performance of Flying Personnel," <u>I. Aviation Med.</u> 17:419-425, 1946.

McDonald, R. K., ROENTGENOGRAPHIC STUDIES OF GASTRO-INTESTINAL MOBILITY OBSERVED IN SWING TEST SUBJECTS, Project Report No. 2, 1946.

McDonald, R. K., and Kelley, V. C., THE TYPE AND DEGREE OF INJURY RE-SULTING FROM ABRUPT DECELERATION; THE QUANTITATIVE DETERMINATION OF PULMONARY HEMORRHAGE, Report No. 494-1, 1947.

McDonald, R. K., Kelley, V. C., and Kaye, R., THE TYPE AND DEGREE OF INJURY RESULTING FROM ABRUPT DECELERATION; THE ETIOLOGY OF PULMON-ARY HEMORRHAGE IN CATS EXPOSED TO ABRUPT DECELERATION, Project No. 494, Rpt. No. 2, August 1947.

Rushmer, R. F., "The Changes in Pressure in the Peritoneal Cavity Produced by Sudden Deceleration of Experimental Animals," <u>J. Aviation Med.</u> 18:199-206, 1947.

Rushmer, R. F., and Hass, G. M., "Comparison of Crash Injuries in Man and in Laboratory Animals," Amer. J. Surg. 76(1):44-50, 1948.

McDonald, R. K., Kelley, V. C., and Kaye, R., "Etiology of Pulmonary Hemmorrhage in Cats Exposed to Abrupt Deceleration," <u>J. Aviation Med.</u> 19:138-145, 1948.

Foltz, E. L., Schmidt, R. P., Thomas, L. B., and Ward, A. A., Jr., STUDIES ON THE PHYSIOLOGIC BASES OF CEREBRAL CONCUSSION, Report No. 55-111, 1957.

## APPENDIX C WINDBLAST PUBLICATIONS

Aeromedical Research Laboratory, Holloman AFB, New Mexico

- Stapp, J. P., "Whoooooosh!" Flying Safety 10(6):2-7, June 1954.
- Stapp, J. P., "Effects of Mechanical Force on Living Tissues I. Abrupt Deceleration and Windblast," J. Aviation Med. 26(4):268-288, August 1955.
- Stapp, J. P., "The Use of Rocket Sleds in Experimental Wind Blast Tests,"
  Second Experimental Track Symposium Seminar Reports and Abstracts of Papers,
  USAF Flight Test Center, 1955.
- Stapp, J. P., and Hughes, C. D., "Effects of Mechanical Force on Living Tissue II Supersonic Deceleration and Windblast," J. Aviation Med. 27: 407-413, 1956.

#### APPENDIX D ESCAPE PUBLICATIONS

Aeromedical Research Laboratory, Holloman AFB, New Mexico

HIGH VELOCITY AIRCRAFT, AD 26 626, 1953.

Stapp, J. P., "Whoqoooosh!" Flying Safety 10(6):2-7, June 1954.

RESEARCH PROGRAM, ESCAPE FROM HIGH PERFORMANCE AIRCRAFT, November 1954.

Stapp, J. P. and Lewis, S. T., "Effects of Mechanical Force on Living Tissues. IV. Time Motion Studies on Escape From Air Transport Following Exposure to Crash Forces." J. Aviation Med. 27(1):173, April 1956.

Stapp, J. P., Heymans, R. J., and Stanley, R. M., "Progress is Steady Toward Solution of Acute Pilot-Escape Problems," <u>SAE Journal</u> 64:44-48, December 1956.

Stapp, J. P., "Human Factors of Supersonic Escape," SAE Preprint No. 748, 1956.

Stapp, J. P., "Human Tolerance Factors in Supersonic Escape," <u>J. Aviation</u> Med. 28:77-82, 1957.

MAJOR ACHIEVEMENTS IN BIODYNAMICS: ESCAPE PHYSIOLOGY AT THE AIR FORCE MISSILE DEVELOPMENT CENTER, HOLLOMAN AIR FORCE BASE, NEW MEXICO 1953-1958, Historical Branch, Office of Information Services, AF Missile Development Center, ARDC, USAF.

### APPENDIX E ESCAPE PUBLICATIONS

USAF School of Aerospace Medicine, Brooks AFB, Texas

- Hass, G. M., "Unsuccessful Use of Parachutes and Cases Resulting from Forces Generated by Aircraft Spins," <u>Air Surgeon's Bulletin</u> 1(10):6-7, October 1944.
- Hass, G. M., A STUDY OF FACTORS WHICH OPERATE AGAINST THE ESCAPE OF OCCUPANTS FROM AIRCRAFT, Project 249, Report No. 1, 5 May 1944.
- Hass, G. M., RESULTS OF DUAL ATTEMPTS AT CONSECUTIVE ESCAPE BY PARACHUTE FROM UNCONTROLLED TWO-SEATED TRAINING AIRCRAFT, Project 328, Report No. 1, 12 February 1945.
- Hass, G. M., THE PROBLEM OF ESCAPE BY PARACHUTE IN ACUTE AERIAL EMERGENCIES IN FLYING TRAINING, Project No. 417, Report No. 1, September 1945.
- Gauer, O. H., "Evidence in Circulatory Shock of the Isometric Phase of Ventricular Contraction Following Ejection," <u>Federation Proceedings</u> 9: 47, 1950.
- Haber, F., "Bail Out at Very High Altitudes," <u>I. Aviation Med.</u> Vol. 23(4):322-329, August 1952.
- Haber, F., ESCAPE AND SURVIVAL AT HIGH ALTITUDE, AD 19613, September 1953.